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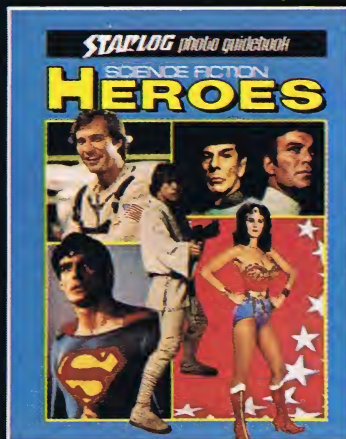


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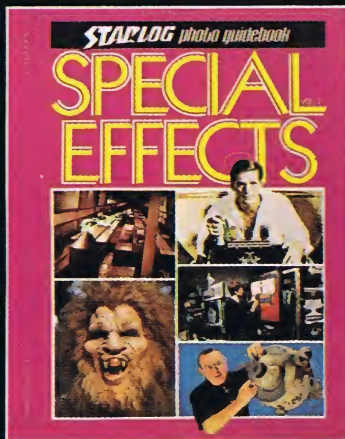
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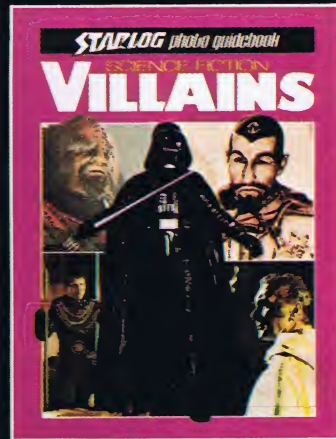
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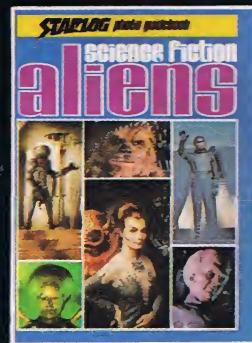
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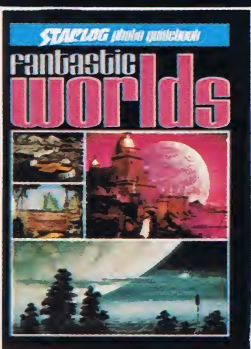
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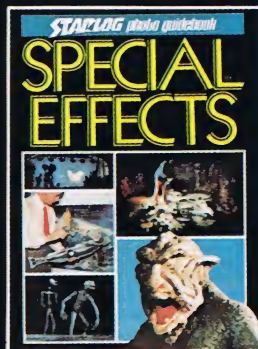
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#19 JUNE 1980

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**ON THE COVER:** Norman Spinrad's Tomorrow essay on the "High" Frontier is dramatically illustrated in this photograph by Michael Sullivan. Makeup by Kate Donahue.

**ON THE CONTENTS PAGE:** These flexifoil kites, which use modern principles of aerodynamics to stay aloft, are only one of many examples of exciting science detailed in a new motion picture called *The Search For Solutions*. For the full story behind this fascinating film, see page 16.

## Escaping "Utopia"

Science fiction literature that looks into the future frequently dramatizes the vanishing of the individual. Imaginary societies in novels like *1984*, *Brave New World*, *This Perfect Day* and *Anthem*, to mention just a few, picture people whose actions and lifestyles are monotonously alike. They are like a herd of sheep. Often, they even *dress* alike in societal uniforms.

If entire books dealt with nothing but the docile members of these future cultures, readers would doze off by chapter three. *Reading* about such gray repetition is as numbing as actually *living* within those totalitarian "paradises."

Good writers understand that to keep readers awake somebody has to stand out—somebody has to reject the mind-dulling sameness that is forced upon the citizenry as a desirable ideal. Good writers create, amid the multitude, a person who has passions and personal goals, who wants a more individualistic lifestyle, who has the audacity to think that his life belongs to him—not to society.

And suddenly we have a hero.

I would guess that individualistic heroes are especially appealing to FUTURE LIFE readers. Why? People who are interested in the future have an idealistic longing inside of them; they want a world that is better than today; they dare to imagine and believe and hope that such a world is really possible.

The fictional hero helps the idealist keep his hope alive. The image of a man (or woman) caught in a total nightmare of conformity—a man who, sinking in socialized quicksand, cries out, struggles, and escapes—is an image that tells people trapped in today's confused mixed-freedom that it is possible to fight our own battles and problems—and to triumph!

A fiction hero who demands to stand alone and who succeeds in his effort to assert control of his own life, gives us an emotional pat on the back—a salute that says, "Yes, you can do it too." Heroes fan the flames of inspiration for those of us who are struggling to hang onto the belief that the future will be better.

Many years ago I ran across a beat-up piece of paper with a credo printed on it. The writer was identified as Dean Alfange, and I presume that this was *not* a quote from a piece of fiction. They are simply the words of a man who is an idealist and who wants life to be as it should be.

Yet, this quotation sounds almost like the speech of a fictional hero of the future—a character breaking away from the muddle and proclaiming his new-found vision of life as it ought to be.

"I do not choose to be a common man. It is my right to be uncommon... if I can. I seek opportunity... not security. I do not wish to be a kept citizen, humbled and dulled by having the state look after me. I want to take the calculated risk; to dream and to build, to fail and to succeed. I refuse to barter incentive for a dole. I prefer the challenges of life to the guaranteed existence; the thrill of fulfillment to the stale calm of utopia. I will not trade freedom for beneficence nor my dignity for a handout. I will never cower before any master nor bend to any threat. It is my heritage to stand erect, proud and unafraid; to think and act for myself; enjoy the benefits of my creations and to face the world boldly and say, this I have done. All this is what it means to be an American."

If I were editing this piece, I would make two changes: delete the word "utopia" and insert "collectivism," and delete "an American" in favor of "a human being."

Kerry O'Quinn/Publisher

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## WASTE NOT . . .

. . . The Earth Control article on hazardous wastes in FUTURE LIFE #17 was interesting. However, you forgot to mention the greatest time-bomb of all, and that is lack of population control of the human race. For example, here in Australia 200 animal species have been wiped out to extinction in the past 209 years (I shudder to think how many have become extinct in America).

The simple fact is that as the human race increases its population (and the Catholic church can take some of the blame for this), the more land it takes up, and the greater the pollution it creates, to the point where every other species has less and less.

Of course, people who read this letter will say "Tut, tut, yes, that is terrible," and then they will get in their cars (the cult worship of the car being the greatest waste of resources and creator of pollution ever invented!) drive home and do their weekly thing which creates more pollution.

For example, each week we create millions of tons of garbage, use spray cans which affect the ozone layer and even when we die we waste million of acres of this planet with graveyards when cremations would solve the problem easily.

If the human race had population control then these problems would not exist.

The prediction of longevity drugs being invented (FUTURE LIFE #12) is entirely in keeping with mankind's selfishness. The thought of an overpopulated, polluted Earth dominated by an aging race 100-200 years old is as bad as any horror story ever written.

No problem on this planet can ever be solved until every country learns to restrict its population. Of course a dozen different religions will give reasons why this should never be, but the real reasons can be summed up in three words: dishonesty, selfishness and greed.

N. Stock  
Willagee, West Australia

## WELCOME BACK

. . . A letter of tribute for the excellent job you are doing putting out FUTURE LIFE. I myself am a living example of it.

Back when you announced that FUTURE magazine was going to become FUTURE LIFE and that the price was going up to \$2.25 per issue, I decided that I would stop getting it. So after the first FUTURE LIFE, I stopped buying them. I kept this up for several months until one day when I went into a bookstore having a half price sale.

Wandering through the shop, I spotted every issue of FUTURE LIFE that I had missed. Not wishing to pass up a good deal, I bought a copy of all of them.

Needless to explain, I went home and read through them all. And what I found was that the magazine that I wasn't buying was an excellent one.

I am now proud to say that my subscription is in the mail and I am looking forward to future (pardon the pun) editions.

J. Matthew Kennedy  
Xenia, OH

## TOKEN THANKS

. . . Three tokes off my pipe for the Hensons growing hemp in space (FUTURE LIFE #17). But they must know a low-THC variety grows in the mid-west that was developed so the U.S. could have rope for World War II without the high.

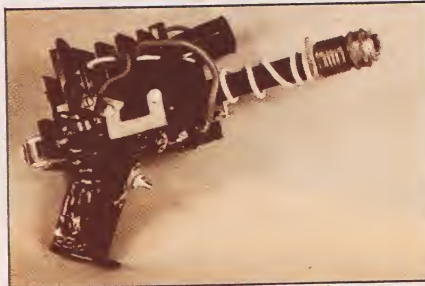
I for one encourage leaving the low-THC garbage on Earth.

Also, three tokes for Andy Guthrie's letter on gays in space. Another three tokes for Octavia E. Butler on the lack of women and non-whites in SF. Fancy gadgets cannot hide 20th century social viewpoints.

A good issue. The only thing that made me gag on my pipe were the SF writers who have so much "faith" in science that they blindly accept nukes, despite the problems and available alter natives.

Baybee Nono  
Bellmore, NY

## JUNK RAY



. . . I enjoyed your recent overview of junk spaceships in FUTURE LIFE #17. "Stalking the Wild Rocket" showed just what could be done with some scrap metal and equal portions of imagination.

The photo feature has inspired me to send you the enclosed photo. Just before Halloween of last year there was some extensive electrical work done in my basement. Needing an accessory to my science fiction-based costume, I did not let the leftover electrical components go to waste. Using your own photo guidebook of *Science Fiction Weapons* as inspiration, I constructed this "junkweapon." When the trigger mechanism is depressed it actually sets off a flashbulb powered by a size D battery.

It just goes to show you that real life people are not only constructing real life spacecraft, but real life super weapons as well. Invaders beware! The Earth is well protected!

Jack C. Harris  
Denville, NJ

## HOME SWEET SAUCER



. . . Your recent article in FUTURE LIFE #17, about pseudo-spacecraft and other laughable (in retrospect) aerospace knick-knacks prompts me to send

you a contribution.

I wouldn't call this a house so much as I would a habitat. It's silly looking but I can appreciate its sense of humor and it might even be livable. Access seems to be through a hatch on the underside. It's located on the way to Signal Mountain, Tennessee, near Chattanooga on US 127.

In south Georgia along I-75 and in Titusville, the slowly rusting remnants of two Titan I ICBMs are used as attention getting devices. They seem complete enough to be refurbished and used as launchers, or they were 10 or 15 years ago before the weathering set in.

Damon Hill  
Atlanta, GA

## GAY SPACE

. . . As associate publisher of the first gay science fiction and fantasy magazine, I can only add with regards to Mr. Guthrie's provocative letter in FUTURE LIFE #17 that we *still* have a long way to go before SF and gay relationships are depicted on the silver screen, or for that matter our television sets. But thanks to writers like George Nader, David Gerrold and Samuel Delaney, who continue to incorporate gay lifestyles within their SF, perhaps someday we'll be able to touch base with the filmmakers of the world.

Who knows what the future holds for *all* of us—yes, including us gay Earthlings. Success and discovery can only be achieved by hard work and dedication; and space exploration *will* succeed through the efforts of men and women who have dedicated their lives to withstand the complexity of space travel, and environmental and biological changes.

Companionship and sexual expression are a large part of the human heart, and biologically, the human spirit could not function nor survive to its total capacity without it. Early space travel could not possibly include "family." It would be inconceivable to venture into places where man had never been; where danger and the possible loss of life are at every turn. So who would it be? Who would be the best equipped to hopefully succeed in man's most important adventure? Who could be the one to travel through time and space, years, perhaps even a lifetime to worlds unknown to man? Away from families, loved ones and many things that man holds dear to himself? A gay person? Why not—it's possible. And if so—should hypocrisy and small-minded individuals prevent the coming of a new and exciting adventure to the children of tomorrow? The future belongs to the young and the still unborn. Old prejudices must step aside in the course of progress. No future is possible without the understanding of man's relationship to himself and his fellow men. If man has decided to go beyond the Moon, and he has, he must pave the way for others and must explore not only the stars and their secrets, but the very secrets and gifts of his *own* body.

Yes—I believe that gays are an important part of tomorrow's adventure, and beyond that, the future of Earth and its relationship to the universe. But the future lies in what man has learned about himself. When man can search within himself—and confess what his thoughts, dreams and feelings are—only then can we all begin and join hands as one human race, determined to explore together his place in the future. Now, if we could all sit back and watch this all on television. . .

Jose Alcarez  
Aura Magazine  
New York, NY



## ORDERS FROM STARFLEET

... I was most distressed when I noticed as a photo for Mr. Guthrie's letter (FUTURE LIFE #17) you had included a picture of Captain Kirk and Mr. Spock from the episode "The Enemy Within." I feel that if you have not been accordingly reprimanded yet I shall take it upon myself to do so. The Kirk/Spock gay relationship has festered in the dark corners of *Star Trek* fandom for too long and should be brought out in the open and properly disposed of. Homosexuals who feel that they must read this absurdity into a perfectly normal friendship just so they will feel more comfortable about being fans of a series which exhibits heterosexuality indeed whenever the topic of sex is crossed do not, in my opinion, have any right to twist Mr. Roddenberry's original intent into a misrepresentation. I feel that this is a result of a need to justify their practices and will feel more in place in the future if they can think the two major characters of *Star Trek* share their beliefs.

Admiral Brandt Heatherington  
Chief of Personnel, Starfleet  
Alexandria, VA

## TREK SEX

... The letter by Andy Guthrie in the FUTURE LIFE #17 Input section was on the subject of homosexuality. He and I are 180 degrees apart on that—but that's not what I'm upset about. He stated his case well, and I believe his letter deserved to be printed. However, I protest *strongly* the picture of Kirk and Spock embracing that you chose to run with the letter. Certain elements of fan fiction notwithstanding, the relationship between these two officers and gentlemen is deep, affectionate, lasting—and decidedly platonic. If you don't believe me, Admiral Kirk himself so states in Gene Roddenberry's novelization of *Star Trek—The Motion Picture*. I expect to be labeled everything from prudish to prejudiced, but I resent the inference of a sexual relationship, homo or hetero, where none exists.

Kitty C. Tilton  
Carson, CA

*What made you think Kirk was embracing Spock? Read on...*

... In Input in issue #17 you ran a letter about gay science fiction. I don't know whether you know this or not but the picture you ran with that letter is a scene from *Star Trek's* "The Enemy Within." This episode, to the best of my understanding, has nothing to do with gay relationships. It is more of a "Jekyll and Hyde" story and as such should not be associated with gay relationships.

I personally have nothing against homosexuals and their relationships but I resent something being associated with something that it has nothing to do with.

I suggest that in the future you make certain the pictures pertain to the letter or article that they are run with.

Lisa Perry  
Rock Island, IL

## IDIC

... I have attempted to write an intelligent response to Andy Guthrie's letter about the lack of gays in SF (FUTURE LIFE #17). Instead of airing my feelings calmly, I keep turning out angry letters. Let me condense them into the following statement:

As a lesbian, I'd like to think the Vulcan

philosophy of Infinite Diversity in Infinite Combinations includes us, too.

Name Withheld  
On Request

## ART APPRECIATION

... The feature on Rick Sternbach (FUTURE LIFE #17) was wonderful. Since he's one of my favorite SF artists, and since I plan to be an SF illustrator myself, it was quite enjoyable to see his work. I also got a kick out of the Paul Lehr centerfold. Not bad at all, my friends.

Mitchell B. Craig  
Lancaster, SC

## OPTIMIST

... Happy second anniversary to the people who publish FUTURE LIFE. I enjoy your magazine very much and wish it future success. I am looking forward to the future because I am sure that things will improve as time goes by.

Duane Zetrover  
Arcadia, FL

## SF PHILOSOPHER

... I've just read FUTURE LIFE #16 and found Theodore Sturgeon's interview really inspiring. His philosophy is so true and has really changed my outlook on life! ☺

Andrew C. Kirby  
London, England

## BRICKBAT AWARD

... While on Christmas leave home from Germany, I eagerly sought out *Star Trek—The Motion Picture* and plunked down my money. Was I disappointed! For the budget that they had, I anticipated a unique story line, not a rewrite of an existing *ST* series episode. I expect garbage from *Battlestar Galactica*, the pilot of which was released in military theaters as a theatrical movie. I expect much more of *Star Trek* and that's why I was disappointed. (Incidentally, FL earns a brickbat for their Databank report in #11 that the *STTMP* scripts were being pirated. My objection is that the single paragraph article gratuitously added details, clearly indicated as coming from the top secret script, that gives the movie away. That was dirty, guys.)

Minor criticism of *STTMP*: The redesign of the *Enterprise* was so extensive, it seemed that much of the original series' flavor was lost, though that might be the result of my own perceptions. I do approve of the redesign of the Klingons' makeup, which makes their skulls look like laced footballs, and of the use of Federation aliens as part of ship's crew. However, the only major plot development I really found of compelling interest was Spock's search for a solution to his inner conflicts and the most satisfying results of that search.

SP4 William "Nick" Howes  
APO NY

## SMART ENTERPRISE

... In FUTURE LIFE #17, your Databank article titled "Dumb Rocket for Space Enterprises" cited a nonprofit organization called Foundation, Inc., headed by Gary Hudson. I would like to acquire its mailing address.

Floyd D. White  
Cove City, NC

*You can write to Gary Hudson at: Foundation,*



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## SF FOR REAL

... In FUTURE LIFE #17 you published a letter from Mark S. Duncan of Salem, Oregon which makes a valid point. All too often, a professed SF fan pays too much attention to the spirit of science fiction rather than the letter.

Science fiction has and will continue to play a key role in expanding our imaginations, our dreams and our nightmares. I find it interesting timing that the *Martian Chronicles* was shown during this time of renewed and revived fears of the war that really *would* end all wars. The scene where Darrin McGavin saw the destruction of civilization on Earth ran a chill up and down my spine.

Let's not leave space entirely to the governments. They are too liable to get screwed up with nationalistic drumbeating to take effective measures that would prevent such nightmares from occurring. The tremendous increase in the popularity of SF can provide the catalyst that convinces the private sector that space can, and *will*, be profitable. The Careers in Space conference can be one more step in that direction.

Marcia Lee  
Seattle, WA

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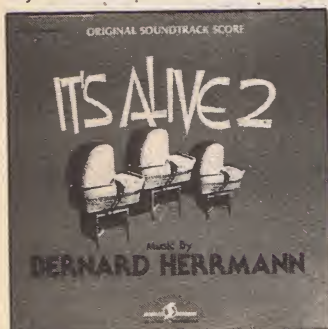


# SCIENCE FICTION RECORDS

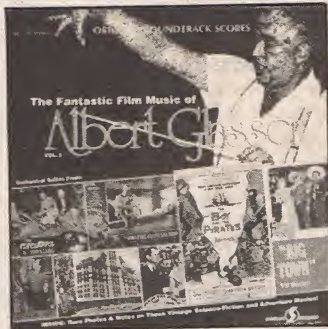
Available for the first time, the complete Bernard Herrmann score to the classic Hitchcock thriller. This is one of the most frequently requested soundtracks among collectors and movie music fans, and at last STARLOG and VARESE SARABANDE have combined forces to release an album that defies description. Recorded in London with a full symphony orchestra using the newest technology (Sony digital and the Calrec multi-dimensional microphone), and pressed in Europe where the quality is the finest in the world, this disc presents truly state-of-the-art audio that will stagger your ears and your mind. Herrmann's music is absolutely electric with thrills and suspense interwoven with a sophisticated wit that perfectly matches Hitchcock's own style. It is possibly the finest music ever written for a movie adventure—a milestone record—essential for every collection!

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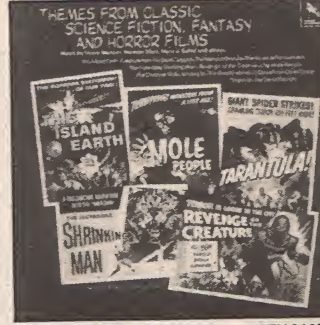
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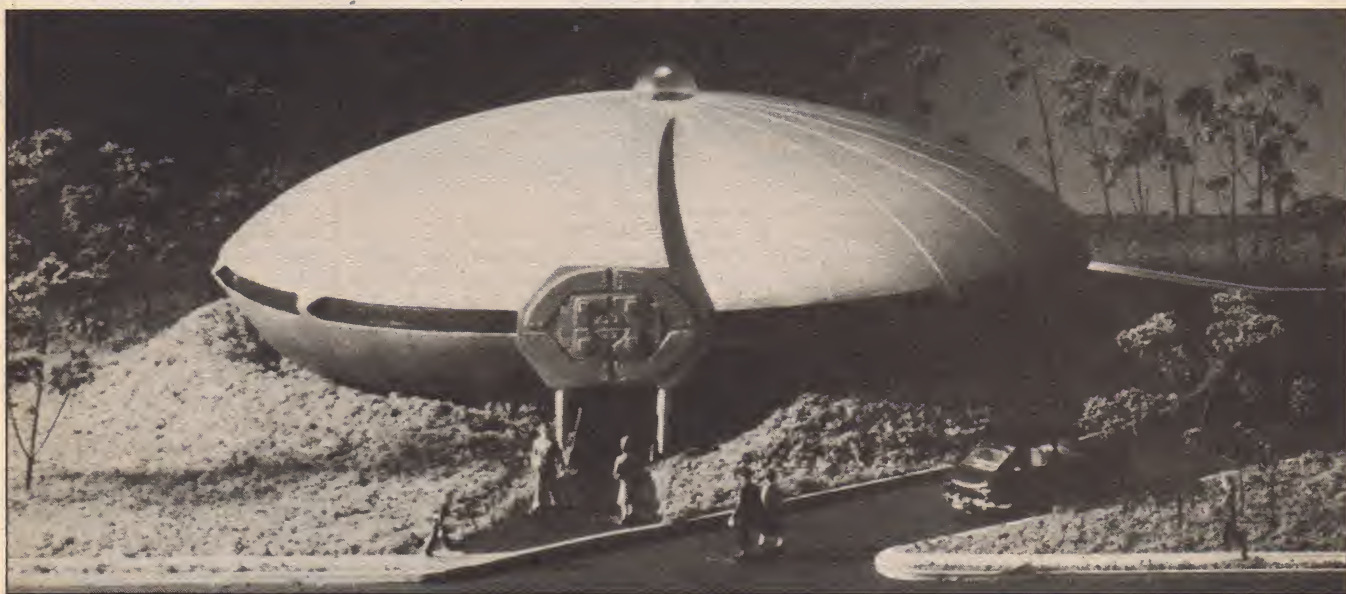
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## SPACE AGE SUSTENANCE

### FRYING SAUCER TO LAND IN NEW YORK

Head for cover, Ronald McDonald, an alien spacecraft will soon alight in Massapequa, New York and it's threatening to take over the fast-food market. The massive, saucer-shaped craft perched along Route 110 is actually a prototype for a new restaurant chain developed by Barry S. Solomon and dubbed, quite logically, Space Station.

"The Space Station Restaurant offers a new experience in dining," Solomon enthuses. Each one of Solomon's ships will be both a dining and environmental treat, according to the restaurateur. "While the menu will feature the freshest of foods," he states, "the environment will transport the patron into the 21st century. The exterior of the building looks, quite simply, like a sleek, aluminum clad flying saucer. Our Massapequa building is supported by heavy landing pods. The diner will walk up a ramp to a set of sliding doors. The doors will remain closed until the customer approaches them. They will then slide open automatically and the customer will walk down into this vast, space station complex.

"The interior of the restaurant will reflect space age technology while still

being comfortable and inviting. We'll have subdued lighting and warm colors throughout the dining area and an animated control center on the mezzanine that will offer a simulated flight through the solar system. Spacesuit-clad employees will service this area to add to the illusion of space flight."

The Space Station Restaurant's menu will consist of fresh fast-food: hamburgers, beef and vegetable pot pie, fried chicken, fish sandwiches, beverages and assorted desserts—all dubbed with spacy monikers. The food will not be of the traditional frozen variety served up in many fast food emporiums today. "Everything will be prepared fresh in our kitchens in front of the customers," Solomon stresses. "The kitchen will be located in a see-through portion of the ship. The kitchen workers will wear space outfits and the entire room will be lit by a warm, colored light."

Once prepared, the food will be dispensed at a semi-circular "command center" at the heart of the facility. On the way to their seats, customers will have the option to add futuristic flavor to their meals via a quick stop at the "robotized condiment stand." Once finished with their repast, guests will then be encouraged to leave their spaceship litter-free and dispose of their refuse and trays in a robot trash-taker that will gobble up

Above: A miniature of the Space Station prototype. Below: An artist's depiction of the restaurant's equally spacey interior.



their garbage and trays with glee.

Additional cosmic ambience will be provided by the sounds of space softly piped through the restaurant, a series of "space commander" toys and giveaways and, for younger customers, a series of "space decoder rings" which will enable regular customers to win free food by deciphering messages written in "alien" lingo. "We're going after the kids with this type of environment," Solomon acknowledges, "but we think we can attract the young people and the adults as well. We want to

make dining a really out-of-this-world experience. I get excited just thinking about the possibilities."

Solomon is so enthused about his prototype space station that he is already in the process of selling franchises throughout the country. "Within the next five years, we should have a least 300 space stations built!" he marvels. "And after that....who knows how far this could go."

Today the Earth! Tomorrow: Moonbase Alpha gets burgerized.

—Josephine Weiner



## FILM FRIGHT

### THING TO COME

John Carpenter, the director responsible for the top box office grossers *The Fog* and *Halloween* has announced plans to remake Howard Hawks' 1951 science fiction thriller *The Thing*. The movie, to be lensed after Carpenter's next two projects, *El Diablo* (a western) and a secret project, will be produced by David Foster and Larry Turnman for Universal Studios. (The studio, by the way, is currently involved in a cinematic resurrection of some of the best-known and loathed science fiction creatures of the 1950s, with a re-make of *The Creature From the Black Lagoon* slated to follow their *Incredible Shrinking Woman* satire.)

Carpenter claims that his *Thing* will differ substantially from the original film in that it will more closely follow the source material, John W. Campbell's story "Who Goes There?" While the 1951 version used Campbell's idea of an alien creature crash-landing near an isolated scientific outpost at the North Pole and slowly stalking its human victims as a



The *Thing*, which made its first appearance in '51, is returning.

source of nourishment, it transformed the creature into a humanoid and eliminated Campbell's original concept of the alien having the chameleon-like ability to change its physical shape into any and all forms—including those of its murdered human victims. Carpenter will reportedly re-insert this aspect into his storyline. —Franz Brinkerhoff

## GARBAGE GOURMET

### LET 'EM EAT SLUDGE

There are those who would say that creepy, crawly worms aren't worth sh...let's say "sludge," foul-smelling leftovers of raw sewage treatment. However, encouraging studies by the federal Environmental Protection Agency indicate that earthworms have not only a bountiful appetite for the unwanted mire, but also pass it through their slinky bodies, producing a valuable soil conditioner similar to potting soil. The transformation is known as vermicomposting, and it may prove to be a partial solution for dealing with the estimated 168 million metric tons of sludge churned out each year in the United States.

The most successful of the vermicomposting research is taking place at the State University of New York in Syracuse, NY, headed up by Roy Hartenstein and Myron Mitchell. Through a series of small-scale experiments, the team has determined that worms' digestive systems break down unsavory elements of sludge and increase the production of

beneficial bacteria that aid in composting of organic matter.

"It is likely," says Hartenstein, "that earthworms may be able to reduce the time for composting by 50 to even 75 percent of that required when microorganisms alone are present."

Joseph Farrell, an EPA chief at Cincinnati's Municipal Environmental Research Laboratory, is not so optimistic. "At this point," he says, "I'm still negative." Farrell's primary objections to vermicomposting are of a financial nature; he maintains that the idea is simply too costly, "offering very little help for all but possibly the very small cities. Yet, Farrell asserts, many such small, rural areas have cheaper and easier alternatives for disposing of their sludge.

Officially, EPA is taking a wait-and-see attitude. In the meantime, the agency has commissioned a study to assess the cost and commercial possibilities of vermicomposting. The survey will determine the fate of future funding for such projects.

Now, if someone can just come up with an ingenious scheme to harness those millions of flies to produce something worthwhile. —Bob Woods

## ZERO G JOBS

### CAREERS IN SPACE SYMPOSIUM SET FOR JULY

The Extraterrestrial Employment Agency hasn't opened yet, but if you have your sights set on an off-planet career you may want to attend a symposium on the subject set for July 18 and 19 in San Jose, California. Co-sponsored by the Bay Area local chapters of the American Astronautical Society and the L-5 Society, the symposium will explore the multitude of space-related careers ranging from engineering and law to medicine and art. In addition to workshops led by professionals from companies, organizations and academic institutions, a literature-packed exhibit hall and a multi-media show entitled "Chronicling the Space Age" are planned.

Many FUTURE LIFE readers



responded to a questionnaire in FL#15, which helped the symposium organizers to formulate their plans. As a result, the symposium has been designed for students and others without access to lavish corporate expense accounts. The total registration fee for the symposium is \$10, and organizers chose the site—San Jose State University—because of the low-cost dormitory housing available (attendees may stay on campus for as little as \$8 per night). Organizers have also dispensed with the usual overpriced (and inedible) banquet in favor of small dinner groups which will be organized to give attendees the opportunity for one-on-one discussions with symposium leaders in their area of interest.

Attendance is strictly limited to 400, so interested readers are advised to waste no time in requesting registration materials. Write to Careers in Space, San Francisco Section of AAS, P.O. Box 7205, Menlo Park, CA 94025.



Some scientists think worms may help us deal with sludge.

## RADIO FREE FUTURE

### WAY OUT WIRELESS

For those who eagerly await the news of tomorrow, a new syndicated radio show promises to deliver just that on a weekly basis. Created by Ron Cutler, president and executive producer of California's Golden Egg company, the show, *Future File*, is designed to please all futurephiles; offering both in-depth and cursory looks at such futuristic topics as UFOs, SF film, future fashions and public transportation. The series, which is aired in both a half-hour format and shorter, bulletin-like versions from market to market, made its debut last January

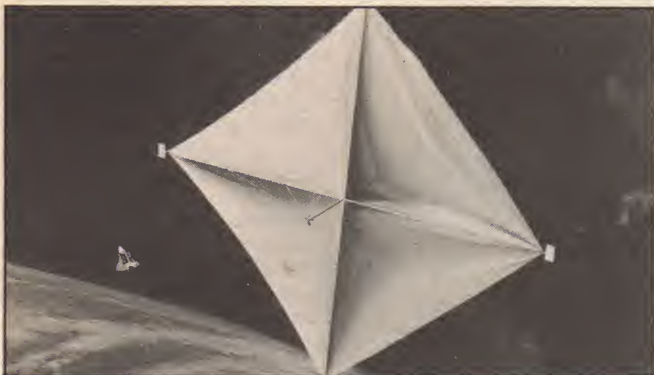
and can currently be heard on more than 125 radio stations including New York's WNEW-FM, Los Angeles' KIIS-FM, San Francisco's KMEL-FM, Windsor/Detroit's WKDD-FM and Akron/Cleveland KAZY-FM.

Recent guests and topics on *Future File* have included Ray Bradbury on future planning, author Norman Cousins on holistic medicine, designer Rudi Gernreich on fashion and Frederick Golden speaking as science editor for *Time* magazine. On tap for *Future Files* to come are Senator William Proxmire, Dr. Timothy Leary, Antoinette Lilly, co-author of *Communication Between Man and Dolphin*, and Gloria Steinem.

—Chesley Vincenzo



## SPACE FOUNDATION



An experimental solar sail is planned for launch by 1983.

**Y**ou say you're tired of waiting for NASA to fund that project you know is the key to the universe?

A unique new organization has been founded to allow the public to participate in future space activities—from searching for asteroids and other life forms to solar-sailing and building life-support systems for orbital habitats.

The World Space Foundation, according to its president, Robert Staehle, is "an independent, non-profit and non-political organization established to focus public enthusiasm into useful space projects sponsored by member contributions and other fund-raising vehicles."

Free from bureaucratic off-again, on-again funding cycles of government, monies would be allocated by the Foundation to selected projects considered important and chosen by the contributors themselves.

One of the first projects now underway and supported by the Foundation is the construction of a small

experimental solar sail, planned for launch in 1982 or 1983. The experiment will provide valuable experience for later solar sail utilization as a propulsion technique. Suggests Staehle, solar sailing may become the backbone of space exploration, providing the most economical means of transportation in the vast new cosmic frontier.

Other Foundation projects presently under consideration for initiation in the near future are: funding a search for Earth-approaching asteroids using ground-based telescopes; development of processes and hardware to extract oxygen and other locally valuable materials from lunar rocks and soil; and aiding a continued search for extraterrestrial intelligence (SETI) using radio telescopes.

For further information on the World Space Foundation and its activities, contact: World Space Foundation, P.O. Box Y, South Pasadena, California 91030.

—Leonard David

## FUTURE COP

**T**he wanton violence of today's world is amplified and transported into the near future in American International's *Mad Max*, an explosive tale of good vs. evil that proved to be one of Australia's top money-making films of 1979. In tomorrow's society, as envisioned by director and co-author George Miller, urban civilization is in a state of terminal decay. The once over-crowded highways are all but deserted; reduced to causeways frequented only by reckless and vicious gangs of marauding motorcycle maniacs. Protecting the remaining pockets of decent citizens is a crack police force made up of speedy Pursuit and Interceptor patrols.

Using souped-up cars and choppers, these future cops employ any and all methods available to them to stop crime. After the death of one motorcycle thug, officer Max (Mel Gibson) decides to call it quits. He's tired of the relentless pursuits, the unending bloodshed. "Only a badge makes us different from them," Max tells chief of police Fifi Macaiffe (Roger Ward) and fellow officer Jim Goose (Steve Bisley) upon his resignation. Taking his wife and infant child out of the area, Max seeks to leave the violence far behind.

The motorcycle gang belonging to the aforementioned deceased criminal vows revenge. Led by the evil and sadistic Toecutter (Hugh Keays-Byrne), the gang pursues Max and his family, eventually cornering them in a nearly deserted area. When the battle is over, Max is faced with a shattered life and a crumbling sense of idealism. Seeking retribution, he dons his police outfit once more and becomes a one-man vigilante patrol. . . . an aveng-



A motorcycle gang marauds.

ing angel known as "Mad Max."

Nominated for ten Australian Academy Awards, including the "Best Picture" accolade, *Mad Max* proved a popular item with Australian audiences largely because of its symbolic attitude towards violence. While the brutality of the future is present at all times, it is conveyed through mechanical means as opposed to outright gore. Over 115 stunt scenes were filmed during the 14-week shooting schedule, largely involving souped-up automobiles and customized motorcycles. In order to film the action sequences, a specially built car had to be constructed to mount the cameras and protect the crew. For many of the sequences, it traveled at speeds exceeding 150 miles per hour. Grant Page, former Olympic athlete, former British Commando and veteran stunt man, was stunt coordinator. Safety control was supervised by Ian Goddard, an internationally known driver and winner of the 24-hour Le Mans Motorcycle Grand Prix.

Not a single accident occurred during shooting. However, an actress and a stuntman were hospitalized with several broken bones as a result of a car accident . . . occurring while they were on their way to work.

—Joseph Kay

An explosive scene from the new action film *Mad Max*.

## ROCKET-SCHTICK

## J-MEN UPHOLD DECENCY

**P**hil Proctor and Peter Bergman, formerly two of the resident crazies in the satirical Firesign Theatre troupe, have concocted a well-aimed science fiction spoof currently awaiting national release entitled *J-Men Forever*. A black and white parody of many of the old 1940 SF serials, *J-Men* actually uses much footage from such cliffhangers as *Rocket Man* and *Captain Marvel* with new, comedic dialogue overdubbed courtesy of Proctor and Bergman. In addition, connecting bits of footage featuring the comedy duo adds to the absurdity of it all.

The story concerns the efforts of The Caped Madman to pollute and destroy the world by popularizing

rock and roll. "I've invented the transistor, mister," he gloats at his followers. Captain Marvel becomes a super being by uttering, not "Shazam," but "Sh-boom," and masked heroes take to the skies singing, to the tune of "Off we go into the wild blue yonder," "Off I go wearing my tight pajamas."

The J-Men, to countermand the Caped Madman's efforts, develop MUSAC: Military Underground Sugared Airwaves Command. The Madman strikes back with "hash gas," distributed by Nazi stormtroopers who salute their leader with a terse teutonic "Shtay High."

The movie runs, trots and falls for 80 minutes and the insidious music of The Caped Madman is provided by Billy Preston and the Tubes. *J-Men Forever* should be stumbling into theaters during the course of the year.

—John Hoxley



## CRANKCASE CINEMA

### MACHINE MOVIES ARRIVE EN MASSE

During 1980, a number of "little" futuristic films will make their way into theaters during the hiatus between such megabuck epics as *The Empire Strikes Back* and *Superman II*. A good many of these forthcoming films will deal, in some way, with the relationship between man and machine.

One good example is the Argosy Film production, *The Last Chase*. Filmed in Canada, the story takes place in the 21st century when a plague has wiped out millions and gasoline and oil shortages have forced citizens to give up private transportation in favor of slow moving electric vehicles and mass transit systems. Making matters even less rosy for futuristic folks is the fact that the few metropolises left intact are ruled in a stolid, totalitarian fashion.

Former racing car driver Franklyn Hart (Lee Majors) slowly reaches the end of his rope. Surrounded by staunch authoritarians in Boston, Hart's will to exist is dwindling. When a video news flash from the outlaw Radio Free California announces that people are rioting for their personal freedom in Los Angeles, Franklyn decides to act. He secretly reassembles his old Porsche 917-10 and, together with freedom-loving boy genius Ring McCarthy (Chris Makepeace), Franklyn makes a break for California; driving at breakneck speed through the city and across America.

Initially, he is pursued by plodding police in their electric cars. When it becomes obvious that Franklyn can make it to California using the left-



Air ace Burgess Meredith chases racer Lee Majors in *The Last Chase*.

over gas in abandoned gas stations, the Boston Safety Commission contacts Captain J.C. Williams (Burgess Meredith), the last surviving air ace of the Viet Nam War. Williams' long lost dreams of flying are rekindled by the Commission. He is promised his own Sabre jet if he will agree to pursue and destroy Frank and Ring. Williams embarks on his mission, a last cross-country chase that must be completed in order to preserve the social system endorsed by the Commission. What the government officials don't realize is that Captain Williams himself is not completely convinced that this particular social system *ought* to be preserved. Soon, the machines of the ground and the air take part in a sprawling spree across deserts and deserted cities in a futuristic flight for freedom.

From France comes the French/West German production *Deathwatch*, a frightening peek at a most

dismal future based on David Comp-ton's novel *The Unsleeping Eye*. In tomorrow's rather drab society, people die only of old age. Disease has been wiped out...almost. TV producer Vincent Ferriman (Harry Dean Stanton) hits upon an idea for a smash video special. He wants to cover "live" the last days of an unfortunate citizen who has contracted a terminal disease.

A contract is signed with dying Katherine Mortenhoe (Romy Schneider), who soon rethinks her decision and sets off on a personal odyssey; seeking out her ex-husband (Max Von Sydow) with whom she is still in love. Ferriman, fearing just such an event, dispatches confidence man Roddy (Harvey Keitel) to the scene; instructing him to get as close to Katherine as possible. Roddy, the audience soon learns, has had a miniature camera surgically implanted in his brain. His eyes are

cameras. Thus, he relays Katherine's final, most intimate days back to Ferriman's TV crew. Directed by Bertrand Tavernier, this film is still awaiting stateside release.

Due this summer from United Artists is *The Final Countdown* starring Kirk Douglas. The movie concerns a most unusual voyage taken by the nuclear-powered Navy carrier, the *Nimitz*. Out on a routine mission, the ship finds itself in the midst of a strange storm. Communication with the rest of the fleet is lost and, suddenly, the radio operator picks up a Jack Benny radio show. A news bulletin interrupts the broadcast, informing the Navy men that Rommel's forces are on the attack in the Middle East.

The crew finds itself back in the year 1941, 300 miles away from Pearl Harbor the day before the Japanese attack. Says Kirk Douglas of the movie: "It's really exciting. We rescue some people from a yacht that's been attacked by a Japanese Zero and there's a senator among the people onboard. When he comes on the *Nimitz*, he can't believe it. 'No propellers?' he says looking at the planes. 'What the hell is this?' He's stunned. Then he gets through to Pearl and discovers there's no such Navy ship as the *Nimitz*. It's quite a moment."

"So our dilemma is obvious. When a spotter plane comes back and reports seeing the Japanese fleet, we have to make a decision. Do we attack and wipe them out and change history—or do we do nothing? After all, we already know the outcome of the war."

Also en route to theaters is AFD's \$30 million *Raise the Titanic*, wherein super-science is put to the test in an attempt to salvage the famous passenger liner. —Charles Bogle

## AMBITIOUS EAVESDROPPING

### SOVIET EAR TO THE UNIVERSE

Soviet space expert Dr. N.S. Kardashev believes the time is near when Earth will intercept an intergalactic "hello" from other beings within the universe.

With an eye, or should we say ear, on detecting extraterrestrial signals, the Soviets plan to mount a new listening effort in the next two or three years. Dr. Kardashev believes, "The program of seeking civilizations may bring positive results even within the nearest decades." Key to the signal-detection project is completion of a new radio telescope facility in the U.S.S.R.'s northern Caucasus.

Both Kardashev and colleague I.S. Shklovsky have proposed to the Soviet Academy of Sciences an even bolder plan for future SETI listening posts. The scientists suggest con-

structing large radio telescopes, miles in diameter, and positioning them in deep space. A possible locale for two antennas is near the orbit of Saturn, separated by a distance of 20 Astronomical Units. (One A.U. is equal to the mean radius of the Earth's orbit—93 million miles!) Collectively, the space-based ears would increase our ability to detect the faint technological whispers of other civilizations hundreds of light years away.

Initial tests of deploying a radio telescope in space have already been accomplished by the Soviets. Near the end of last year's record breaking 175-day orbital endurance flight, two Soviet cosmonauts unfurled a 33-foot KRT-10 radio telescope from their Salyut-6 space station. Information gleaned from the experiment will aid in future space assembly of larger antennas, say Soviet engineers.

If signals are detected, what's the

## TIC-TAC-TV

### VIDEO VIEWS

The latest brainstorm in video engineering comes from Sharp Electronics in the form of the Multi Vision color television. Using nine separate screens combined into one, the Multi Vision will allow TV addicts to see nine different shows at once (ostensibly to allow them to choose which show they'd most like to watch). This idea is an extension of Sharp's Dualvision television, which uses a small, silent black-and-white image in a corner of the screen to

allow the viewer to see two channels at once.

In addition, Sharp is planning to include yet another feature which is sure to be handy. The Multi Vision will enable viewers to freeze nine consecutive frames of the action—in other words, the nine screens would show nine consecutive still photos of the action as it took place.

There are as yet no plans to market the Multi Vision television in the immediate future. Presumably, Sharp would first have to figure out why anybody would want one.

—Barbara Krasnoff

next step? Some scientists believe we should be satisfied with just tapping into a galactic party line of other inhabited worlds. Should Earth transmit the ultimate Celestial Citizen's Band (CCB) message: "Breaker, Breaker. How are you doing good buddies?"

Several experts caution against

firing off a hasty signal, fearing someone might follow the greetings back to our home planet. The response from Earth, however, if there's to be one, could take 30,000 years to reach a prospective interstellar neighbor—not making for snappy conversation!

—Leonard David



## TECH TALK

### ELECTRO-BABBLE

As if we didn't have enough problems with noise pollution, four top electronic concerns are now preparing a series of "talking" devices ostensibly meant to make our lives easier.

Texas Instruments, Inc. has developed one of the more logical of these gadgets: a talking language translator. Using a speech synthesizer chip, a controller and four ROM memory chips, the hand-held computer will pipe out the appropriate phrases (in the correct accent) in English, Mexican Spanish, Parisienne French or German. Japanese and Chinese will also eventually be available.

The languages are translated through separately purchased modules, one for each language, that are inserted into the main computer. Each of these modules will contain about 1,000 words, half of which will be both spoken and displayed; half of which will be only displayed. An earplug is also provided, so the user will have a choice: when stuck in a foreign country face-to-face with a non-English-speaking national, he will be able to either repeat what the computer tells him to say, or shove the translator at said national and let it do all the work.

The Texas Instruments Talking Language Translator should be available sometime this year, retailing for about \$300, with each language module costing about \$60.

Sharp Electronics is developing two talking machines: a calculator and a digital clock. The calculator, using a voice synthesizing system, will verbally confirm each calculating process at each key operation, thus assuring nervous users that they have indeed pressed the correct button. It will also have a playback function that will repeat the calculating processes used. The talking digital clock will, upon touching a special key or using a remote control device, relate the correct time in a human voice. Sharp has not yet announced when these products will be available.

Toshiba has been developing a system that will take the work out of home entertainment. In two or three years, they say, American consumers should be able to walk in the front



TI's Talking Language Translator.

door, say "On" and watch their television sets obediently flicker into life. The television will also answer back ("Okay!"). Using a new computerized process, each TV set would be programmed to an individual's voice pattern and preferred list of commands; additionally, viewers will be able to program their sets to respond any way they want. Toshiba is also working on an audio entertainment center that would respond to voice commands—you could order your stereo to repeat a record, for example, or tell it which radio station you want to hear. This is all in the process of being perfected, Toshiba says, and no set price or market date has been scheduled.



Sharp's clock with remote control.

Finally, for those who are baffled by the intricate workings of their microwave ovens, Panasonic is now developing a talking oven which will keep verbal track of its various functions. Subtly titled the Genius, the oven will name each function activated by the user (e.g. defrost, high, warm, etc.) and then repeat the sequence of orders to ensure that the cook has programmed it properly. It will also announce each function as it is reached during the cooking cycle.

The ramifications of this trend are sobering. One can imagine the poor besieged householder of the future—between the clock calling out the time, the calculator calling out its numbers and the oven screeching about the burning roast (not to mention the various noises coming from the stereo, the radio and the television), he or she will be hard put to get a word in edgewise.

—Barbara Krasnoff



Sharp's conversational calculator.

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# EXCITING SCIENCE

*The Search for Solutions* is an innovative film which sheds new light on the scientific process.

By BARBARA KRASNOFF

With today's rising enthusiasm for science fiction, *Star Wars* and high technology, you'd think that thousands of students would be queuing up at their local universities for degrees in biology, astronomy and all the other "ologies" that fall under the general category of science.

Apparently not, according to James C. Crimmins, executive producer of an innovative science film called *The Search For Solutions*. About three years ago he spotted an article in *Business Week* magazine which said that large corporations were having trouble recruiting scientists and technicians. "I found out that everybody was turning away from science," he explains. "We fell out of love with science somewhere in our past. When you talk to people about it, they drone on and on about all the bad things that 'science' has done, as if it was some sort of villain in our midst. Science was the faith of the '50s and some of the '60s; and then we said, 'But you promised! You promised you wouldn't do any bad things to us!' But science never made that promise. We kind of stuck it on.

"The interesting part of it is that we are going to spend our next years on this planet dealing with more and more scientific issues, and our ability to deal with it rests on some sort of understanding of what's going on in science. Yet all over the world the dropouts in science are significant, particularly among

women and minorities. And not only here, but in Europe. The Eastern European countries are having seminars and meetings about what they're going to do about this."

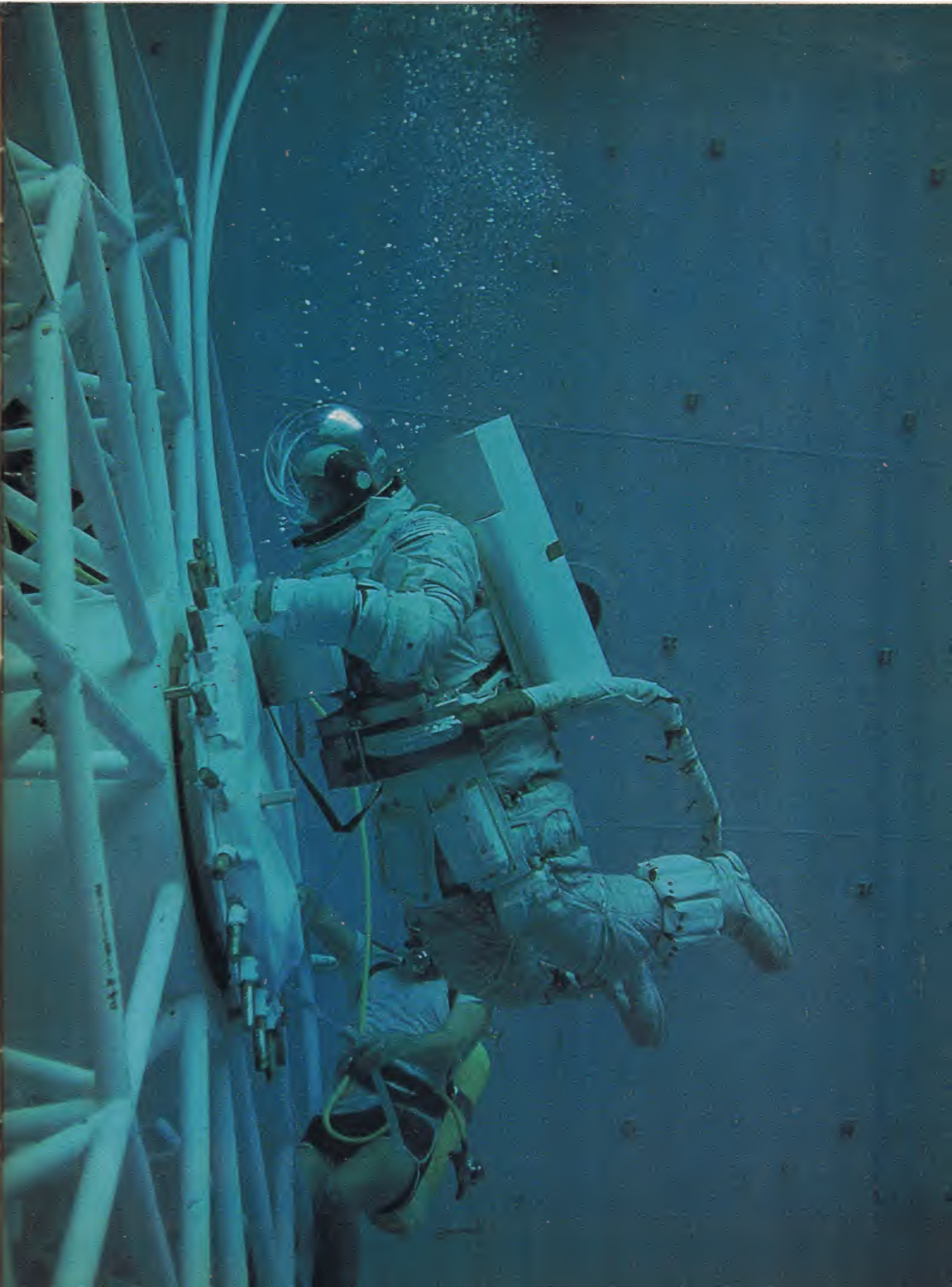
Brad Darrach, a major writer for the film, agrees. "It didn't take much looking into," he says, "to realize that *one* of the problems, at least, is the way science is taught. It's the scientific method. It seems to bore people almost to extinction."

"It occurred to me," Crimmins adds, "that perhaps we don't understand what the real fun of science is, which is problem solving. And that if we really got at it, not the sci-fi view and not the high technology, Dr. Strangelove view, and for once didn't have a lecturer from the BBC presenting it—if we could just get alongside some scientist, doing what he or she does and sharing that moment—you might have some good film, maybe even good theater."

The result of all this was *The Search For Solutions*, a three-hour film that presents scientists, engineers, artists and amateur inventors working at their individual fields and trying to produce new discoveries or improve upon the old. It is divided into nine 20-minute categories that cover what the filmmakers consider to be the more important components of scientific research: Context, Evidence, Trial and Error, Modeling, Adaptation, Prediction, Investigation, Patterns, and Theory. Each segment is a compendium of

Astronauts go underwater to prepare themselves for a weightless environment.









PHOTOS: © 1980 PLAYBACK ASSOCIATES

In order to illustrate the different methods of science, the makers of *The Search For Solutions* filmed a large variety of subjects. Above: In Modeling, scientist Harold Robinson uses "soap bubble technology" to find the most practical shape for future space colonies—structures that will fit into one another and will best withstand the stresses of space. Right: These hang gliders were designed and redesigned to get the optimum response possible to wind and air conditions. Below: David G. Wilson, not convinced that the traditional bicycle was the ultimate in human-powered transportation, designed his "recumbent bicycle." According to Wilson, his vehicle is both safer and more comfortable for long-distance journeys.



short films, connected and explained by Stacy Keach in a running voice-over narration, which illustrates the different areas in which each type of research can be utilized.

For example, in Context we are introduced to two young researchers who are studying bears in hibernation; because of those studies, scientists are suggesting that it may be feasible in the future to use fat people as astronauts who could, in an emergency, live longer on their own bodies' food stores. Additionally, an archeologist explains how ancient clay tokens which were originally thought to be simple gaming pieces were found, when placed in conjunction with other artifacts, to actually be the oldest examples of writing. Through Modeling, Harold Robinson studies the structure of soap bubbles to find the best architecture for a future space colony; U.S. astronauts build structures underwater to simulate the zero-gravity of space; and Nobel Prize winner Linus Pauling plays with rough sketches of chemical bonds and ends up with the first true picture of a protein.

In order to obtain film footage of these people actually working at their projects, rather than simply sitting them in front of a camera and having them lecture to an unseen audience, Crimmins dispatched a camera crew headed by director/camerman Mike Jackson. Backed up by a second camera unit, Jackson and his crew traveled 150,000 miles in 14 months in 14 countries on five continents—logging in 150 hours of film.

Naturally, in following assorted scientists





around the world, difficulties were bound to come up. "We agreed to meet with Carleton Gajdusek, the gentleman who won the Nobel in 1976, in the jungles of New Guinea to get a good look at the kuru virus, which is a virus spread by cannibalism," relates Crimmins. "And since the cannibalism is dying out, he was going back there to trace the virus in its next stages, because it may be the key to a lot of modern diseases like senility. So he said, 'Okay, meet me in the jungle'—kind of Stanley and Livingston—and I said I would, I'll take the gamble. So I sent the crew up to New Guinea. They fly to the outback, drive three days into the jungle, hike up to where they're supposed to meet him—and he's decided he wants to go investigate something else, and is now a thousand miles off in the jungle on his own with just a guide." He shrugs. "Needless to say, the crew had to cover the story as best they could, after they'd gone halfway around the world to chase it."

Their bad luck didn't end there. In Boston, director Jackson cracked two ribs in a car collision; in Norway a hang glider he was filming crashed and the pilot was seriously injured; and in Egypt he was arrested on suspicion of spying.

However, Crimmins says the cooperative attitude of the scientists more than made up for the snags. "They loved it," he says. "And they also loved not lecturing for once. The medium for communication for most scientists is either the scientific paper, which is sort of neatening up what you do and presenting it not as you did it but as you wish you did it, or

lecturing. But they really like chatting to people.

"We filmed some 250 scientists, and used about 150, and none of them objected to giving us time, sometimes spending days with us in the wilds getting at what they're doing. Most people who really care about what they're doing love an audience."

*Search* spotlights about 20 female scientists, including archeologist Denise Schmandt-Besserat; British scientist Kes Hillman, who studies wildlife in Africa; and Jocelyn Bell Burnell, who discovered the first radio signals from a neutron star. The emphasis was no accident, Crimmins explains. "We went after really good role models so that women seeing the films, girls seeing the films could say, 'Hey, it's a possibility!'"

When the total 150 hours of film had been gathered, it was up to the editors and writers to organize it all into a cogent and interesting three-hour motion picture. "I've never been through such a thing," smiles Darrach, a former *Time* magazine film reviewer.

"We had with us Gerry Jones, who is a science writer for the *New Yorker* and *The New York Times*, and Lorraine Cudmore, who is a fully trained PhD in biology—these were our two science writers. Denny (James) Crimmins and I were the nonscience writers.

"It was an absolutely mixed thing. I worked on everything, Denny worked on everything, Gerry probably worked on four or five films at one time or another, Lorraine the same. It was an intensely shared thing." He grins. "Denny's strongest contribution

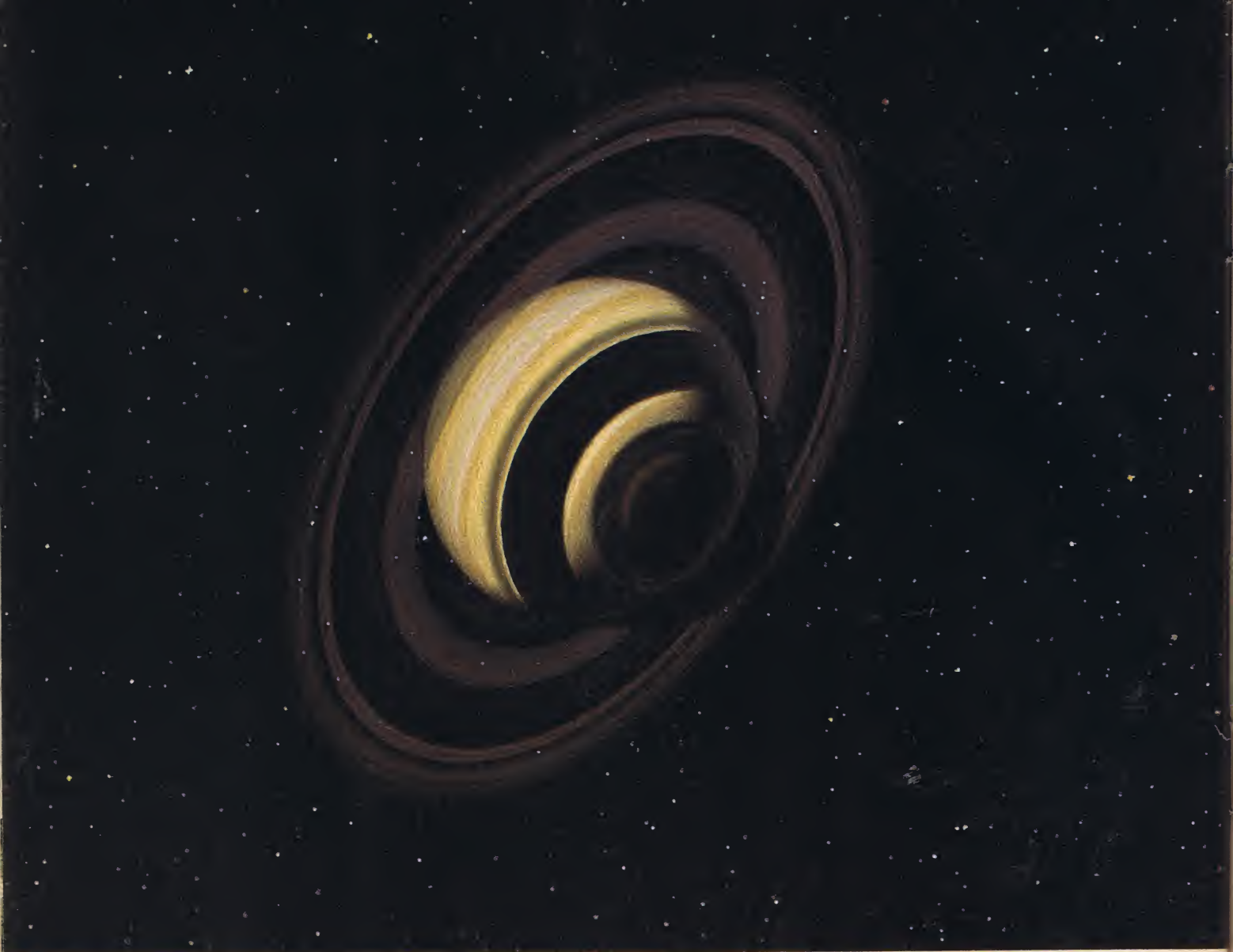
was his uncanny ability to hold the whole damn project in his head, and therefore, when it came to problems like what shall we run next, what should be the sequence of these episodes or what are the basic ideas that should be here and not there, he was continually making contributions.

"And it was absolute hell. It was the hardest thing I've ever done. The object was not to be literary, but to be very clear and at the same time interesting. And yet, you can't compete with the music, or with what you're seeing on the screen, or with what other people are saying on the screen. A lot of the scientific ideas would have fitted into any one of three or four films. And just to go through that much film and select the things you want to use is a huge job. It triples or quadruples the amount of time you have to spend thinking. For example, we were actually working on one film, *Trial and Error*, for something like 11 months. And I wrote 23 versions of *Adaptation*.

"I suspect that *Adaptation* was the toughest. We originally called it *Change* as a tentative title. The problem there was that we had to get somehow from the idea of simple change into suitable change; the solution had to suit the situation. And we had to get from there to feedback, because feedback is a very subtle and complicated use of constant adjustment, constant adaptation, constant relationship—the problem is always in relationship to its environment. Some of our advisors suggested it to us, and the more we dealt with it, the more we thought it was one of the most

(continued on page 66)





ART: © 1978 DON DAVIS

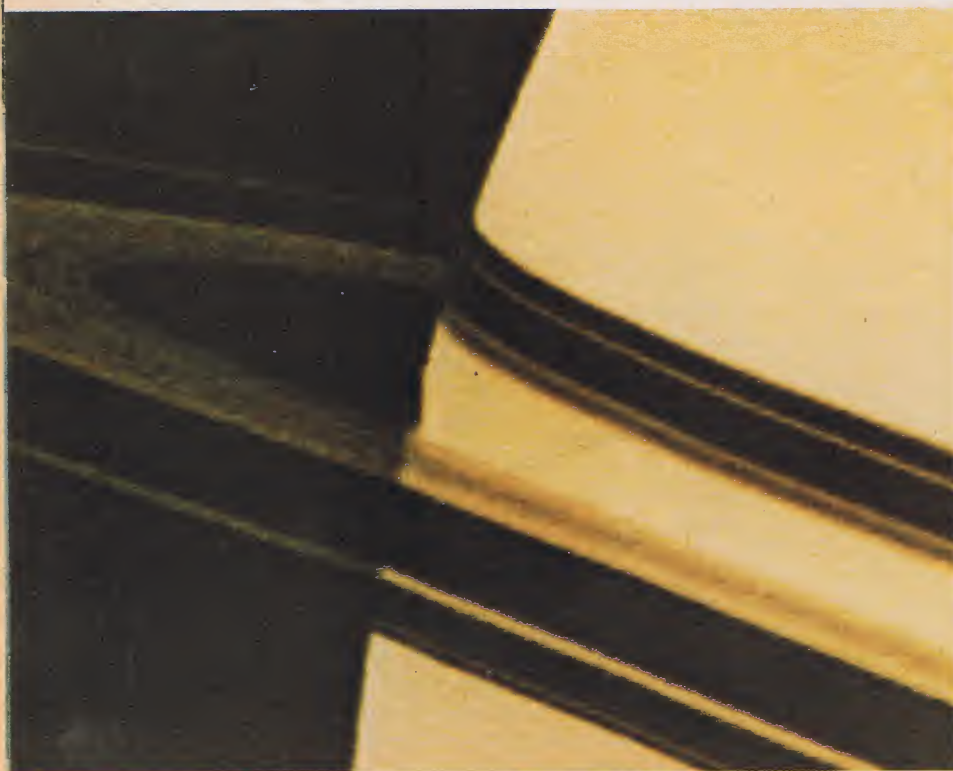


PHOTO: NASA

Above: Davis' view of Saturn before the Pioneer encounter. Top: His revised view with even darker rings. Left: Actual Pioneer photo of Saturn and rings. Facing page, left to right: David Egge, Don Dixon, Geoffrey Chandler and Don Davis.



# Saturn Celebration

By DON DAVIS

Each of the unmanned planetary probes of the 1970s brought new visions of truth concerning our neighbor worlds. Before our eyes, fuzzy Earth-based photos gave way to richly detailed vistas.

Among the various media represented at these increasingly rare events can be seen artists who specialize in the field of astronomical art, present to see their beloved subjects as never before.

Now Saturn has begun to reveal its secrets, thanks to the efforts of NASA's Ames

Research Center, which controls the Pioneer 11 spacecraft.

Ames is a vast assemblage of impressively large buildings spread out near the shores of San Francisco Bay. Last September, as the Pioneer spacecraft neared its closest encounter with Saturn, artists Don Dixon, David Egge, Don Davis and Geoffrey Chandler got together there for a group photo.

Soon afterward, in a dimly lit room filled with tensely occupied chairs, the countdown to the critical first pass through Saturn's rings

proceeded. The moment came and the successful crossing was heralded by explosive applause. It was a moment in exploration equal to the lunar and planetary touchdowns of the past.

Even the first taste of new information about the beautiful ringed planet had the space artists off and running, revising their previous visions to agree with the latest views.

David Egge rendered a Saturn view showing the dark rings, working feverishly on his apartment floor for *Astronomy* magazine. At the same time, Don Davis quickly reworked a picture of the details of the ring system of Saturn to match what is now known. Unlike the familiar bright appearance of the rings we've all come to expect, it turns out that once the rings are *between* the viewer and the sun, or "backlit," a strange new, darker ring system appears. The earlier painting had merely assumed a darker version of the usual view. The reality shows that the thinner gaps in the rings allow more light to pass through, leaving the denser, normally bright regions almost opaque. This is the first painting to show these new details.


While celebrating the new details about Saturn, space artists, scientists and stargazers in general still look forward to future missions which remain to fill the wide gaps in our knowledge. Coming up next: The Voyagers which recently delivered the spectacular vistas of Jupiter and its moons are due at Saturn in August of this year and June of 1981. These astronomical artists intend to be on hand for the show. 

PHOTO: COURTESY GEOFFREY CHANDLER





## What explains the present lack of citizen interest in and support for the U.S. space program?

ROGER ZELAZNY



PHOTO COURTESY ROGER ZELAZNY

*Nebula and Hugo award-winning author of approximately 85 short stories and articles, as well as 25 novels, including This Immortal, The Dream Master, Four For Tomorrow, Lord of Light, Damnation Alley, Doorways in the Sand, The Courts of Chaos, The Chronicles of Amber and Roadmarks.*

There are two factors, as I see it, the first one being the current state of the economy, causing the administration and Congress to be more cost-conscious. This has made it more difficult for NASA, with a shrinking budget, to set up long-term goals and, hence, to make predictions of achievements in space. A realizable space time-table would help in focusing public attention on the space program. We simply do not have one which arouses any great interest. For example, no date has yet been projected for a permanent manned space station.

The second thing seems to be that we do not look upon the space program as representing national strength in the same way that the Soviets do. They have sent 26 cosmonauts into space in the past four years, to break all of our Skylab records and to log half again as many man-hours as we have overall. And they talk about it with obvious pride, as a demonstration of their technical achievements, as a matter of international prestige.

If you want to know what I think is going to happen, I believe that the Soviets are cur-

rently working on a space shuttle of their own and will have a permanent manned station in space within the next three years—crude, perhaps, compared to the best that we could manage with full funding—but something capable of being expanded, something which could eventually serve as the basis for assembling in orbit a manned interplanetary vehicle. I feel that it will be the military possibilities of such a station, however, that will act as a spur to our own space program, much as the first Sputnik did in 1957, causing us to step up our own efforts—probably with a crash program—to set up a permanent manned space station of our own. At such a time, there will probably be more public interest and support, as it comes to be looked upon both as a matter of defense and prestige.

ISIDORE HAIBLUM



PHOTO: STANLEY LEVINE

*Yiddish novelist and humorist, he has authored several science fiction works, chief of which are: The Tsaddik of the Seven Wonders, Transfer to Yesterday, The Return, The Wilk Are Among Us and Interworld.*

Why should citizens support the space program? Citizens these days have their own problems. The cities are falling apart, inflation is chewing up people's savings, health costs are going sky high, and unemployment is edging its way toward a national figure of eight percent. The space program made good copy for journalists, and will probably put Tom Wolfe's new book on

the best-seller list. But what has it done for you and me lately? Or any of our relatives?

I think it should also be noted that the derring-do characters who fought their way through the pages of our favorite science fiction magazines in the '40s and '50s did not turn up in the actual space program. In real life, knowing how to operate a machine proved more important than the ability to make a quotable quip. If Luke Skywalker had had the quality of a real-life astronaut his picture would have been a flop.

With Ted Kennedy throwing his hat in the ring, the Ayatollah hunting down those who "war against God" in Iran, and our television networks grappling for first place in the ratings, how can a mere space program compete?

Now, if any of those space probes had brought back a genuine alien or two, at least we science fiction writers would have probably felt a bit better about it. As things stand, however, the space program looks as dead as a dodo. And just about as interesting.

JOAN VINGE



PHOTO: FRIFF

*Hugo award-winning writer, she began publishing science fiction with "Tin Soldier" in 1974. Since then, she has produced several well-received works, among them: Eyes of Amber and Other Stories, Fireship and The Snow Queen.*

I can think of two possible causes for a falling-off of citizen interest in the space



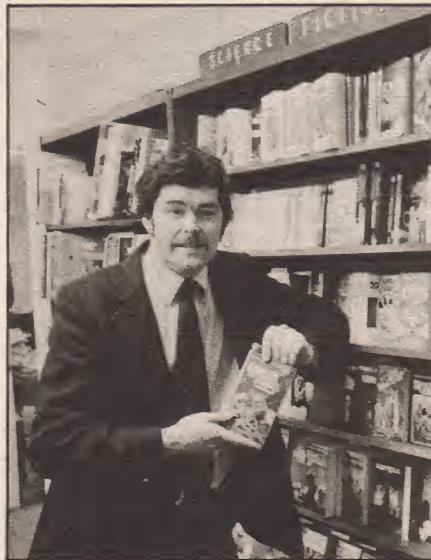
program. One is inherent in the program itself, unfortunately—it has been in existence for long enough now that it has become “old hat” to much of the public. The days of a competition with the Russians for dominance in space have passed; John F. Kennedy’s goal of putting a man on the Moon by 1970 was achieved a decade ago. The projects that NASA is concentrating on now are potentially much more useful—projects like the space probe exploration of the solar system and the development of the space shuttle—but their visual and media attractiveness is generally much lower than that of the early space flights.

This is primarily because the time span required to show results from projects such as the Jupiter fly-by is measured in years—long years during which nothing is heard about its progress. People simply forget about it in the meantime. And, too, there are no glamorous personalities associated with an unmanned probe, or with the shuttle program. When there were only seven astronauts, we all knew their names. But now there are hundreds of astronauts and other scientists waiting to ride the shuttles—all of them virtually anonymous.

However, I think an even greater reason for the erosion of public interest lies in the current state of society itself. The past decade has been one which has seen the boom economy of the 1960s shrivel, while inflation, unemployment, and the energy crisis have focused people’s attention strongly on their own comfort and survival. The long-range vision required for an enthusiastic support of the space program has shriveled up along with the Affluent Society; government spending on projects not seen as directly affecting “down to Earth” necessities of life are regarded as inflationary and extravagant. Coupled with this narrower focus is a basic disillusionment growing out of the social unrest of the late ’60s. The mistrust of technology that was a part of the ’60s feeling, combined with a ’70s sense of futility about our ability to change or even control our environment, has probably caused many people to feel the old belief that “technology will cure all ills” is no longer true.

Whatever the reason, it is true that the magic has gone out of the space program for many Americans. I think this is a very unfortunate situation, because the space program, aside from giving us amazing glimpses of what lies beyond our sky, has also given us the beginnings of a number of important industries—from transistors and microprocessors to solar energy. The potential for future industrialization in space is high, once we pass the threshold of the space shuttle program. The U.S. space program is by no means a cure for all our ills, but it can offer us ever increasing benefits if we continue to give it the opportunity.

## JAMES P. HOGAN



*British-born electronics engineer and computer specialist, he is a master of “hard” science fiction, with such thrillers as **Inherit the Stars, The Genesis Machine, The Gentle Giants of Ganymede and The Two Faces of Tomorrow.***

“I’m having to siphon the lawnmower to get my car to the gas station, my heating bills would buy Fort Knox, the interest on my mortgage just went out of sight, my company is talking about laying people off, the I.R.S. wants the fillings out of my teeth, my 15-year-old daughter smokes pot, dates a communist and thinks she’s pregnant, and my doctor says that too much health causes cancer. You wanna know why I’m not curious about the infra-red emission from Saturn!”

The response of the average American of today to the question would probably run something like that.

The problem is, of course, that the man in the street sees nothing in the space program or its aims that will influence the issues closer to home, nearer the heart, and demanding on the pocket; therefore he doesn’t find time to think about it too much, or any obvious reason for wanting to. On top of this the citizen in today’s society of constant change possesses a relatively short attention span of interest that requires the stimulation of “something different” in the daily diet. To satisfy this need he becomes mentally locked into and dependent on the offerings dispensed by the news media until his thinking is virtually shaped by short-term topics currently featured in newspapers and on the TV. At the present time the media are not plugging the space program, presumably because it isn’t considered newsworthy right now; therefore the average citizen doesn’t think about it.

Another reason is that things like the energy problem, inflation, Middle-East politics, the SALT treaty, and so on all bear directly on the life of the average citizen and his family, and are therefore of concern to him; nothing that happens to a probe several hundred million miles from Earth is likely to have any direct impact. There was a lot of citizen interest in the space program when Skylab was coming down.

Also, regrettably but predictably, I think the country is still suffering from a degree of disillusionment after the magnificent achievement of the Apollo program. Apollo, of course, was very newsworthy; the media plugged it extensively, and everybody thought about it and sustained interest in it. If science could lay down a detailed schedule for a task as awesome as getting to the Moon and then proceed to carry it through calmly, confidently, in detail and ahead of what seemed an impossible deadline, then surely science could do anything. All of the problems and hardships that had plagued mankind since history began were about to be swept away forever. The masses had at last found their panacea... or so for a while they thought. In fact if any power has the potential to wipe away humanity’s scourges it is indeed that of science and reason, but scientific discovery is a slow, steady process that requires perseverance, patience, and tenacity; people who didn’t understand science wanted all the results *now*. But years after man landed on the Moon people were still starving, nations were still fighting, and Utopia hadn’t happened.

Finally, the authorities responsible for “selling” and publicizing the space program tended to adopt a somewhat naive approach in the form of stressing the short-term, trivial spinoff benefits such as non-stick frying pans and pocket calculators instead of educating public awareness of the longer-term and deeper implications of the whole thing. The true significance of a full-fledged space exploration program lies not so much in the spectacle of extraterrestrial activities *per se*, which is exciting enough to be sure, but in the setting up of the industrial base needed to make such a program possible, along with the high technology, advanced research, skilled labor-force, and educational system that go with it. These are the foundations needed upon which to build a society capable of breaking through the problems confronting the human race at its current point in history. The problems are essentially to do with a minority of “haves,” too many “have-nots,” and “finite” resources.

Resources are finite only within the framework of a given system of economics and technology. In past eras of history the work that could be done by a man’s muscles, the number of slaves he could own, the number of horses he could buy, and so on all



represented finite resources which limited the amount of wealth (expressed ultimately in terms of provision for food, shelter, and clothing and attainable living standards) that he could create in a year. In the advanced sector of today's world such factors are irrelevant and whether or not they are finite is immaterial; we worry instead about oil, gas, raw materials, deforestation, and so on. These things are finite within our current economic and technological framework.

Periodically, however, the human race makes quantum leaps into totally new regimes of possibilities and achievement that are qualitatively distinct from anything that went before, rather like the phase changes that govern the transitions of a substance between solid, liquid, and gaseous states, where completely new laws of behavior take over and the old laws cease to apply. An example was the discovery and harnessing of electricity, which opened up whole new realms of phenomena that were not simply extrapolations of the technologies of earlier centuries. When such quantum leaps in technology occur, they invariably open up new dimensions of individual opportunity, lifestyle, and ultimately freedom, and are usually followed by periods of political and social upheaval while society adapts to and absorbs the new values created. It's interesting to note that the major problems confronting the government of 16th century England were over-population (relative to what the economy of the time could comfortably support), inflation, unemployment, and fuel shortages... with a population that was tiny compared to the incomparably better-off one of today.

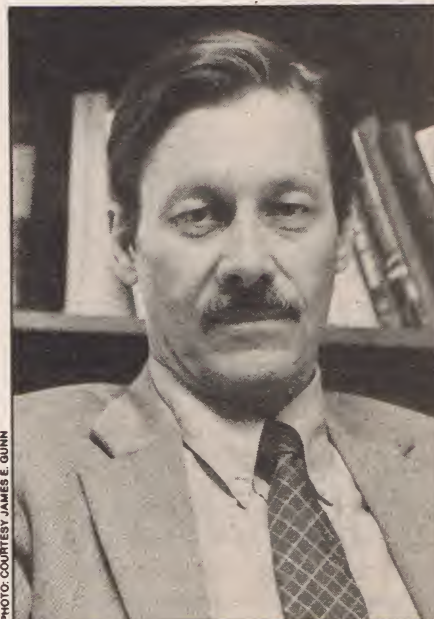
The infinite extent of space stretching away on every side of us surely symbolizes that there are no limits to the growth of our civilization either in terms of what can be achieved or of how far it can spread. The powers of human intellect and inventiveness have repeatedly broken down barriers to progress previously thought to be insurmountable, and shown themselves capable of creating new sources of wealth, energy, and productivity which have carried us through progressively higher levels of control over our environment.

An energetically supported, comprehensive space program would signify most importantly a commitment to the attitude of mind that must be adopted if the human race is to break out of the straight-jacketing acceptance of the need for austerity, scarcity, conservation and zero-growth. These are imagined limits consequential of our current economic system and the conventional technologies upon which that system is based; they are not absolute. The sciences and technologies required to realize a realistic program of space exploration and construction—including for example a fully nuclear-based economy worldwide which would lead eventually to controllable fusion plasmas

—would afford not merely abundant and cheap power, but also revolutionary methods of primary metal extraction (applicable to lunar rocks), cheap raw materials of all kinds, economic large-scale desalination of seawater (and hence abundant food through irrigation programs) and inexpensive "cracking" of seawater to yield hydrogen as a basis for the manufacture of cheap synthetic fuels. Given all that plus space travel, the "limits" to growth all crumble away. Just as the pressures that built up in Europe 400 years ago precipitated the wave of migration and expansion that founded the New World, so those same pressures repeating on a global scale today will trigger the move up off the planet, and out of the solar system, and who-knows-where after that.

The average Neanderthal hunter was probably too busy to pay much attention to whoever invented the wheel; the Medieval peasant probably didn't care about what the first ocean-going sailing ships would find over the horizon; the midwest farmer at the turn of the century probably didn't get excited about the Wright Brothers' experiments at Kitty Hawk. Perhaps if the citizen of today were allowed to share more of the vision of the tomorrow he is helping to build for his children, their children, and the generations that will follow them instead of being told about frying pans and computerized tic-tac-toe, he'd feel differently about the space program and where it's leading.

JAMES E. GUNN



Since he started writing science fiction in 1948, he has written 17 books and edited five. His major works include *Star Bridge* (with Jack Williamson), *The Joy Makers*, *The Immortals*, *The Listeners*, *The Magicians* and *The Road to Science Fiction*.

The present lack of citizen interest in and support for the U.S. space program seems to me to stem from a couple of decisions made by NASA and other government leaders early in the space program. The first was to assure citizens that spaceflight was a completely normal, safe enterprise; the consequence of this was the public image of a program filled with all-American astronauts and great rooms of equipment and monitors. The very language of the space program was prosaic: ascent stage, command module, extravehicular activity, lunar orbit insertion, portable life-support system... NASA opted for the engineering approach, for prose rather than poetry, and the public got bored.

The second decision was to emphasize the immediate goal of landing a man on the Moon. It may have been necessary to mobilize the necessary support to beat the Russians there, but by the third or fourth landing the public was bored. It would have been better to keep constantly before the public that the Moon was only the first step into space, that beyond lay Mars, Jupiter, and the outer planets and beyond that, interstellar space—a bit of poetry and a dream.

LARRY NIVEN



Hugo and Nebula award-winning author of *World of Ptavvs*, *A Gift From Earth*, *Ringworld*, and, with Jerry Pournelle, *A Mote In God's Eye*, *Inferno* and *Lucifer's Hammer*.

Do I really have to tell this audience that most of humanity are mundanes?

Most people don't care whether someone lands on the Moon or not. Most people don't try to predict or shape the future except in the most personal and local fashion.

My collaborator Jerry Pournelle has harsh words for the NASA publicity department, whose peculiar skills allowed them to write of the most exciting event in human history, and



make it dull. Reverse Midas Touch, he calls it. Me, I get irritated when I remember how many science fiction writers attended the launchings at Canaveral by scrounging press passes. What should have happened is this: The newsmen who attended should have been forced to prove that they had published at least one science fiction story within the previous five years.

But these are symptoms of a basic fact: Most of the world doesn't care. They put their effort into shaping their own futures, assuming that what is true now will go on forever. The percentage of *us* is much higher than it used to be—thanks to the lunar landings and their live television coverage, thanks to those mind-blasting pictures from Jupiter and Saturn, thanks to *Star Trek* and *Star Wars* too—but it's still small.

What to do about it?

1) Don't panic. *The mundanes don't stop us.* They don't care either way. The most they'll stir themselves to is blocking tax dollars from funding interesting research. So—

2) Stop buying Wisconsin cheese until Wisconsin fires Senator Proxmire. Find other targets among those who block government funding for research in space, for orbiting power plants, for the shuttle and for alternatives to the shuttle.

3) Be careful who you vote for. (Vice President Mondale made his position clear in 1976. He thought the shuttle was the most important decision then to be made, and he was against it. The shuttle budget was chopped immediately after the election.)

4) If anyone asks, you're in favor of the neutron bomb. (If any of us survived that war, we'd still have a civilization to return to. It's not certain that civilization could be rebuilt from scratch; the easy resources are already gone.)

5) Find out who your congressperson is. Write him expressing your views. (People have been telling me that forever; I'm sick of hearing it, but it's still true.)

6) Push where you think something will give. Tell heart patients where their monitoring equipment came from. (It's *all* from the space program, from instruments designed to tell ground-based doctors what was happening to apes and men in orbit. My Dad got an extra 12 years after his first heart attack because of the space program.) Pass the best (and most nearly set in the present) of your pro-space novels on to your mundane friends and relatives.

7) Don't give up. Knowledge doesn't get lost. Today it spreads at lightspeed. Every defeat is only a postponement; every victory is permanent.

Thirty years from now, the mundanes will think that the value of the orbiting solar power plants was obvious to everyone. And they'll be moaning about the tax dollars going into a permanent space station outside Jupiter's bow shock wave.

## CHARLES SHEFFIELD



PHOTO: DOUG CRAMER

**Author of *Sight of Proteus* and *The Web Between the Worlds*, he is vice president of Earth Satellite Corporation and president of the American Astronautical Society.**

Is there really a lack of interest in the space program? I think there is not. I think the average citizen finds the *results* of the space program fascinating. My evidence? First, the number of articles that are written on such things as the Voyager fly-by. I do not think that you would see such intensive coverage if people were not interested—commercial interests would prevent it, since the media have not usually been motivated largely by altruistic and uplifting feelings. Second, look at the Air and Space Museum in Washington, D.C. It outdraws all other museums there by a factor of at least two, and it is the most-visited museum in the whole world. People are fascinated by the results of our air and space exploration. Third, talk to the astronauts who have given round-the-country lectures. They will tell you that the first few questions they get in an evening may be on the costs and the benefits of space exploration. But after that first few minutes—almost as though it were needed to satisfy people's consciences—the question of cost disappears, and people begin to ask “What's it like out there? What would it be like for *me* if I were able to go out there?” That's what turns people on. I think there are millions of people who groan when the latest TV program about the 1980 election comes on, but who will sit and listen and watch programs on space and its mysteries.

But what about the question of *support* for space activities? Now we are into a complex area. The question of space program support is usually asked not as a stand-alone thought, but more as a question of *alter-*

*natives*. If you go to someone and say, “Are you willing to give up your TV football coverage (brought to them, as often as not, over communications satellites) in order to fund the Galileo mission?” they'll answer—and who can blame them?—“Hell, no. Anyway, what's the Galileo mission?” If you try to take money away for a purpose that people don't understand, it is not surprising if they don't go along with it.

Why don't they know what the NASA missions are? That's a sad situation. The public relations that NASA conducts about its own programs is unbelievably bad. The result of all this was stated long ago by Robert Heinlein: “NASA has taken the most exciting development in the history of the human race, and made it *dull*.” I like to think of it as the Reverse Philosopher's Stone—they turned gold into lead.

So, *interest* in space, yes, it's there in abundance. *Support* for space expenses? Not the way it is being sold now—I wouldn't buy it myself, if that's all I knew.

But suppose that you broaden the question and go out and ask people, “What does the United States have that is its most treasured possession?” A few may talk about the Constitution, or democracy, but a surprising number will tell you that it's *American know-how* that separates us from most of the rest of the world. The country has had a long history of being first in science and technology.

So if you were to say to people, “Are you willing to spend your tax dollars in developing United States science and technology?” you'll get a lot of support—even from the same people who are scared of, for instance, nuclear energy development. There is a basic understanding that our lives depend more and more on an effective technology, even though there may be resentment of that fact.

Now, how does science and technology relate to the space program? Over the past 20 years, it has been the tip of the pyramid, the lead edge—pioneering in medical work, in micro-processing, in materials, in remote measuring, in monitoring of processes—you name it, and during the '60s and '70s, if it involved research work, the space program has made a direct (usually) or an indirect (more rarely) contribution.

Why is there this apparent contradiction, that people sense the need for us to spend our money more and more in science and technology, to put ourselves in the forefront of development there, but at the same time they do not think we can afford to spend their dollars on space? Obviously, they do not see the connection between the two. And obviously, someone is failing to draw the line of connection clearly enough.

Who do I blame? Basically, I blame the scientists themselves, for failing in two different ways. First, there is a degree of compartmentalization now in science, one of narrow disciplines and limited scope. This is



caused partly by the fact that we need to specialize more to understand any field—all fields have been growing at a fierce rate—and partly by the fact that the word “scientist” does not mean what it meant 100 or even 50 years ago. Now, perhaps 80 percent of practicing scientists are “career” scientists, who expect a good living to come from their efforts, and who realize that the luxuries will come only if they are not merely successful, but *famous* (i.e., *proven* successful). With such attitudes, scientists regard their territory as jealously as any starling, and encourage the tight compartments that true science should deplore. These same compartments will now compete for funds—not agreeing that a dollar spent on the possible discovery of new particles may offer the final tool for cancer cures 80 years from now.

If I am right, modern scientists have become their own worst enemy, by failing to recognize and emphasize the inter-connected nature of all science.

I said the scientists had failed in two ways. The other failing arises from specialization also. I prefer to call it bad public relations, but it is just as validly a failure to realize that science cannot prosper without a set of common objectives. Instead of the message being, “Solar power is better than nuclear power,” or “Cancer work is more important than solid state physics,” or “Put money into laser research and not into artificial intelligence,” the united statement put forth by all scientists, regardless of their discipline, ought to be, “Investment in science and technology is the most important investment that the United States can make.”

Think of almost any group in this country (e.g., the military, the medical profession, the mine workers, and so on) and you will find that when it comes to issues in their common interests they will speak with one voice. Come to Washington, any day of the week, and you will find on Capitol Hill a large number of lobbyists for the oil companies, for the insurance companies, for the banking interests. But you will look for a long time before you find the “science lobby.” It is considered as something that is *beneath* scientists—and perhaps it should be. On the other hand, unless the equivalent of a science lobby is set up, I do not think that we will ever see Congress moving forward to give the country the unified science program that most people admit we will need in the next 25 years.

The space program is vitally important to the United States simply because it is one of the key pacing items for science and technology development, for the production of the advanced methods that decide the world position of this country (and the internal standard of living) for the next 10 to 20 years. That’s how the program has to be presented to the public—not as an isolated series of space spectaculars, not even as the bread-and-butter efforts of the weather

satellites and the communications and Earth resources satellites. It will be the single most important item in deciding the position of this country on the international scene. The spin-offs will come in both the civilian and the military areas, and the need for more advanced technology is there for both. (It would be nice if we could drop the military efforts—but at the moment we know for a certainty that the Soviet expenditures in that area keep growing and growing.)

Let me put this all together. What explains the lack of public interest and support for space? Simply this, that the public does not know the relation of space to all science and technology. Why doesn’t the public know it? Because we have not made the point clearly enough, loudly enough, and unitedly enough.

I have hopes that this will change in the near future, and that we will create a “space lobby.” It will not be funded out of profits, like the milk, oil, banking, and wheat lobbies. It will instead be funded at a meager level, and will obtain its effectiveness because of a shared belief of a very large number of people.

## RICHARD LUPOFF



**Author of *One Million Centuries, Sacred Locomotive Files, Sword of the Demon, The Triune Man, Sandworld and Space War Blues*. His writing spans several genres, including fiction and nonfiction. In recent years, he has established himself as a first-rate critic, as well as one of the field's most respected historians.**

I'm afraid that the average human being is vastly more concerned with the immediate and everyday realities of mundane life than he or she is with such seemingly remote and

abstract notions as sending a spaceship to land on Neptune. That's understandable. We all have our worries and concerns, bills to pay, worrisome symptoms to take to the doctor, careers to pursue, kids to put through school, and a thousand and one more matters. Who cares about another planet? Who cares about another star?

It's the President and the Congress who decide how the Federal budget is going to be spent. And no smaller entity than the Federal government—not any single state, not any corporation or foundation or university or voluntary association—can support the effort that it will take to explore the solar system.

The world armaments race gobbles up hundreds of billions of dollars worth of resources every year. If and when we can stop that madness, there will be a “peace dividend” not only for the United States but for every nation in the world.

What will become of those resources? Not that any such happy problem is likely to occur, but just in case... what will become of those resources? Can we get the President and the Congress—not to concern ourselves at the moment with other nations—to devote those resources to no less a goal than the exploration of the universe?

Think about that. Roll that phrase around on your brain, and on your tongue. Don't be afraid of it. Don't be embarrassed.


### *The exploration of the universe.*

But the President and the Congress will be under many other pressures, very *legitimate* pressures, as to how to devote the resources. Medical research and treatment facilities, urban renewal, job training and development, educational advancement at every level from pre-school to post-doctoral, replacement of ruined housing and upgrading of salvageable housing, feeding the world's hungry mouths, and so on *ad infinitum*.

How can a remote and abstract concept like “the exploration of the Universe” compare with something as real and immediate as filling empty bellies?

Well, maybe we can fill the empty bellies and explore the universe. And maybe the two things can interweave, and in the process of traveling to the planets, and eventually the stars, we can learn things and find things that will feed bellies, cure cancers, build houses, and so on and on.

In the process of developing the Apollo capabilities that brought us to the Moon, a great many useful and practical inventions and discoveries were made. Or so I've been told. NASA and the other interested parties certainly did a lousy job of publicizing those achievements. Maybe a good public relations campaign is what we basically need.

Or maybe we could just let the three television networks bid for exclusive rights to footage of the next mission to Jupiter. That might pay the bills right there. 



## Your Chances For Extraterrestrial Employment

**T**he first cosmonaut was a dog. The first astronaut was a monkey. Alan Shepard's and Yuri Gagarin's jobs were first successfully performed by creatures whose I.Q.s would make a moron blush.

I'm not trying to downgrade the astronaut and cosmonaut corps. The near-fatal Apollo 13 mission and the repair of the crippled Skylab required every ounce of brains and guts those astronauts had. But many of their space activities were not all that demanding.

Today we still insist that our astronauts be superhuman. But what happens when dozens, hundreds, thousands of people are living in orbit, bolting together power satellites, hauling asteroid rock, tending crystal growing vats? Most jobs will be blue collar, the type you can apply for at smelters and tractor production lines. Many jobs will be *really* low brow: mopping floors, peeling potatoes. Things a grade school dropout could do.

For example, a recently completed study at the Massachusetts Institute of Technology proposes an orbiting space factory with 400 workers. According to researcher Dave Smith, 200 of these people would work at "support" type jobs—they'll be janitors, dishwashers, cooks, etc. The rest would primarily be technicians, people who have a knack for fixing broken widgets. This factory, which would produce solar cells, electrical conduits and structural members from lunar materials, could begin operations by the late 1980s.

Does this mean that in less than ten years an average, even below average person could get a job in space? No way, say NASA and aerospace industry insiders. "We'll insist that the guy pushing a broom have a PhD," predicted one executive.

Why? The government and big business are scared silly of sabotage, strikes and revolts. What happens when orbital transfer tugs are piloted by Teamsters? When Cesar Chavez stalks the hydroponic lettuce farms of space?

But PhDs, they figure, are probably safe. They have to slave an indeterminate number of years under often tyrannical professors, knowing their careers can be broken on a whim. Most PhDs would never dream of going on strike, never scale the barricades. And, just to be on the safe side, NASA plans to continue to give psychological tests and check the pasts of their recruits to weed out the



overly independent types.

Let's assume, for the sake of argument, that a PhD with dishpan hands will remain content. Anything to get a job in space? What are the consequences of a geniuses-only barrier for space workers?

A recent survey by Rockwell International revealed that support for the space program is concentrated among the highly educated and wealthy, while the poor and uneducated tend to regard it as a boondoggle. (In fact, many believe the space program is a hoax, done up with elaborate sets like the *Star Trek* movie.) "I want to be in on the colonizing of space," one woman wrote to me. "Unfortunately, I have a small problem. I have a high school diploma but the grades aren't good enough to attend the college of my choice. I have military experience behind me—I am classified a marginal performer... I'm pleased with the lady astronauts but also very upset, as I don't want to be left behind."

Why should people like her be forced to spend their tax dollars to put the cap and gown set in the driver's seat of space tugs? It's hard to get excited about sending a privileged elite into space while the rest of us are left behind.

So how can we go about ensuring that space in the '80s is opened up to everyone? First we're going to have to tackle the fear of rebellion. Mark Hopkins, a researcher with the famed Rand Corp. think tank, has proposed a solution. Strikes and revolts can be

avoided, he says, "by such policies as rewarding outstanding space workers in the pre-colonist days with positions as colonists and by rewarding colonies having particularly high productivity records with early dates for independence. An atmosphere of high dedication and faith in a better future is the best way to prevent disputes from leading to seriously disruptive behavior."

Unfortunately, there are two roadblocks to setting up space workers so they can earn independence. These are the 1967 Outer Space treaty and the proposed 1979 Moon treaty. The '67 treaty demands that all space activities must be conducted under the control of some Earth government. The proposed '79 treaty mandates the creation of a single, monolithic regime to govern all activities which use celestial bodies or follow orbits around or trajectories to them. This regime would be controlled by Earth on a one-nation, one-vote basis.


How can we throw off the yoke of Earth imperialism? We could do it via the method of armed insurrection. Personally, however, I'd rather avoid this route as some of us may get killed.

The other approach is to get the U.S. President to refuse to sign the '79 Moon treaty and to pull the U.S. out of the '67 Outer Space treaty. In place of those colonialist documents we can then create a space bill of rights, one that will give people of every nation a fair chance to enjoy the resources of space, not as sharecroppers under the colonial yoke, but as free peoples earning their homes and independence.

Once we set up this framework for freedom NASA won't have an excuse any more to exclude us from space jobs. So then the question is, how can we select who will go?

How about a job lottery? Give everyone—the girl working at Penney's, the Chicano driving a truck in the Silverbell copper mine, the double amputee Vietnam veteran—the realistic hope of becoming a space pioneer.

Once several million people have signed up for the space factory job lottery, you'll see a real boom in space program support. Those appropriations bills for space industrialization will suddenly become a promise of adventure and romance, homes and independence, not just for the highly educated elite, but for everyone who wants to go.

If this scenario appeals to you, please let President Carter know. Write 1600 Pennsylvania Ave., Washington, DC, 20500. 



# BEYOND STAR WARS

Master illustrator Ralph McQuarrie designs widescreen wonders for *The Empire Strikes Back*, the long-awaited *Star Wars* sequel.

"I want to give young people some sort of faraway, exotic environment for their imaginations to run free," filmmaker George Lucas commented in 1977. "I have a strong feeling about interesting people in space exploration. I want them to get beyond the basic stupidities of the moment and think about colonizing Venus and Mars. And the only way it's going to happen is to have some kid fantasize about getting his ray gun, jumping in his spacesuit and flying off into outer space."

The resulting product of Lucas' fertile imagination was *Star Wars*, a swashbuckling widescreen space opera that took the movie industry by surprise and the nation by storm. The biggest money-maker in the history of the American cinema, *Star Wars* introduced millions of fantasy fans to the world of extra-terrestrial idealism; inspiring some moviegoers to see the film eight, ten and twelve times. And just what was the key ingredient of *Star Wars*' success?

According to Lucas, it presented an "intergalactic dream of heroism" to all those young at heart enough to enjoy it. The film traced the efforts of the young Luke Skywalker, pilot Han Solo, intrepid Princess Leia, hirsute Wookiee Chewbacca and faithful droids R2-D2 and C-3PO in their struggle to overthrow the neo-Nazi galactic government—the Empire.

Now, after three years, Skywalker and his impavid peers are back in an all new *Star Wars* sequel *The Empire Strikes Back*. The \$20 million production once again pits the stalwart rebel forces against the Empire's most deadly ambassador, Darth Vader. In this outing, Vader and company are still incensed over the rebels' destruction of the Empire's all-important doomsday machine, the Death Star. Tracking the rebel forces to the ice planet of Hoth, the Empire lashes out against the galactic guerrillas with lightning speed. Luke, Han and company seek refuge in the floating city of Bespin where, aided by space rogue Lando Calrissian, they plot their strategy for their next head-on clash with Vader's villains.



PHOTO: © 1980 LUCASFILM LTD.

Once more, Skywalker's adventures appear to be out-of-this-world both in terms of scope and design. And, once again, helping producers George Lucas and Gary Kurtz achieve their cerebral spaciness on screen is designer Ralph McQuarrie. As production illustrator for the original *Star Wars*, the former Boeing artist conjured up some of the film's most memorable fantastic elements: the sleek look of evil Darth Vader, the Merlinesque figure of Obi-Wan Kenobi and the monolithic menace of the Sand Crawler. Continuing in his creative role for *Empire*, artist McQuarrie has concocted some equally impressive sights for 1980's science fiction epic.

"I worked on almost everything," says McQuarrie from his West Coast studio. "There were only a few scenes in the film that I didn't contribute to. But," he hastens to add, "there were also some things that I designed for the film that were subsequently dropped, usually because the space on the sound stage wasn't adequate, or the designs would have been too expensive to build for

the small amount of time they would have appeared on the screen.

"There were a few designs for this picture that I was disappointed didn't make it into the movie. But, I really can't talk about them. I don't want to spoil any surprises."

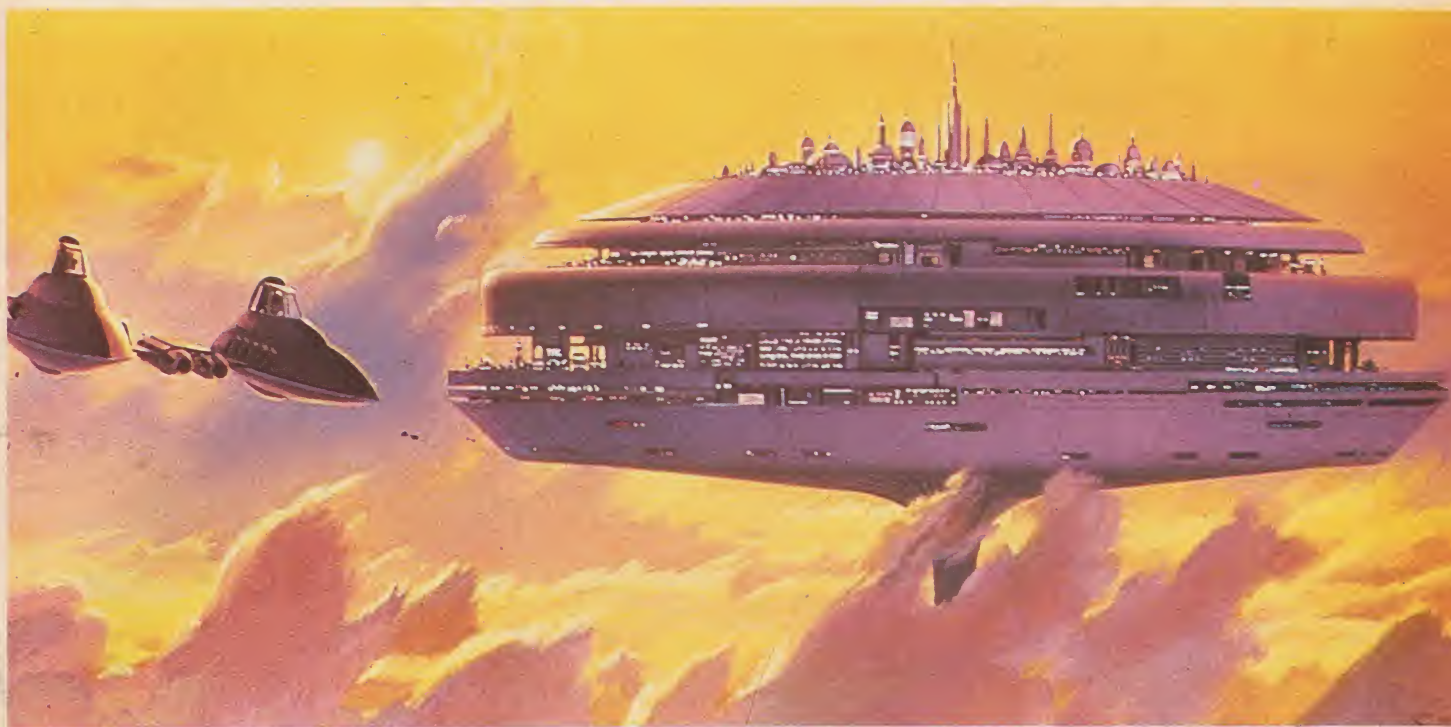
The artist emits a soft chuckle. Apparently, working with executive producer Lucas is almost as invigorating an adventure as any enjoyed by Skywalker on celluloid. "It's a pretty unique working situation," McQuarrie concedes. "I am production illustrator and my job was designing. But I'm certainly not the final say on anything. I contribute my ideas. George, the production designer and the illustrators then use my stuff as a sort of reference. It's a constant process of change. For instance, there are always some areas where George has not quite decided on what he really wants. He wants to explore any and all possibilities in order to get the best results possible. This, of course, entails a lot more work in terms of design.

"On this movie, we started designing before we had a finished script. We were working on instructions from George. It was all pretty mysterious at times. We didn't know exactly what was going to be used or how. One example. I was working on the design of an animal called the tauntaun. It's this large beast that Luke rides around on. I thought it was going to be used in the middle of the desert. As it turns out, it's an animal that has to function in the snow! So," he adds with a laugh, "I took back the beast and winterized it. Later, Phil Tippet redesigned it and improved it quite a lot for the snow.

"We worked almost a year just on the pre-production art before everything was finalized and taken to England where the sets were being constructed. As we worked more and more on the movie designs, we changed things more and more, improving elements constantly. We practically were working down to the last minute."

*The Empire Strikes Back*, the second of Lucas' nine proposed *Star Wars*-related film fantasies, was a challenging project from its  
(continued on page 56)





Above: McQuarrie's colorful rendering of the floating city of Bespin, one of the many ports of call frequented by Luke Skywalker and his peers in *The*

*Empire Strikes Back*. The concept of the cloud city was originally created for the first *Star Wars* scenario but was saved and embellished for the second film.

To the left of the city are two short-distance spacecraft. "I refer to those as cloud cars," says the artist. "They're used the way automobiles are used on

Earth today." Of all the designs executed for *The Empire Strikes Back*, McQuarrie is the proudest of Bespin—although his bog planet (not shown) rates a close second.



Above: The *Millennium Falcon* lands on the cloud city of Bespin and is met by Han Solo's old crony Lando Calrissian. Says McQuarrie: "Han and company

have just escaped from Hoth and they've made it to Bespin. You can see C-3PO in the background holding their bags. The fellow with the sort of cape

on the right of the painting is Calrissian. The finished scene in the film was shot from pretty much the same angle, although you see two different cuts.

In the first, the rebels leave *The Falcon* and, in a longer shot from above, you watch Calrissian walking onto the landing area with some of his people in tow."





**Above:** The interior of the rebel stronghold on the ice-world of Hoth. From this outpost, the rebel forces battle the attacking forces of the Empire. Says Ralph

McQuarrie of the ice-blue scene: "I did quite a few paintings of the ice caves to give us a feeling of how the tunnels might look in terms of actual depth. They were

constructed almost identically on the finished set. The actual tunnel areas on the set were constructed on a relatively small scale. I think the longest one was about 30 feet.

There was a large painting down at one end of the set which made it seem a lot longer with other tunnels branching off the main cave at various angles."



**Above:** Another look at the frigid fortress commanded by the rebels in *The Empire Strikes Back*. On the ice planet Hoth, the rebels stave off enemy armies

with sophisticated weaponry. Comments McQuarrie: "Those two vehicles in the foreground with the stubby wings are armored speeders. Those are

low-level fighters. They're based on things we called 'tank busters' during World War II. In the back you can see the massive entrance to the cave.

The ice caves were fairly complicated, with each ship having an individual little ice-hangar. We also designed lockers for the interiors." (Not shown)





Above: The Probot, one of thousands sent out by the Empire to search for the new rebel base. Artist McQuarrie is quite pleased with the intricate

piece of alien machinery. "It's sort of a spider-like craft," he explains. "I envisioned it as a graceful mechanism that just sort of floats across the

terrain. In this particular painting, I borrowed the background terrain from a *National Geographic* article on Alaska. Eventually, that frigid backdrop became

the ice planet Hoth." It is on Hoth that the rebels have set up their latest power base and it is on Hoth where a fierce battle occurs when an Empire force lands.



Above: Outnumbered rebel warriors fend off the forces of the evil Empire inside the ice cave on the planet Hoth. In the finished film, the ice cave sequence will

match McQuarrie's painting dramatically. "Sometimes the finished product differs a great deal from my paintings," comments the artist. "Some-

times not at all. Many times George (Lucas) will like what I've painted, but for reasons involving physical space, time or budget, the

decision will be made to either tone it down, modify it or eliminate it. I don't always know how my designs will turn out on the screen."







# Nuclear Disaster In the Cinema

By ED NAHA

**T**he specter of World War III is in the headlines once again. As tensions mount in the Mid-East and the spirit of detente, so carefully nurtured for years, crumbles with each new barrage of verbiage from both the U.S.S.R. and the U.S.A., the press and public alike are once again being introduced to the state of nuclear paranoia. "Cold War II" is here, proclaims one New York newspaper. At a White House press conference, a reporter asks the President what means are available to thwart Russian troops in Afghanistan aside from "nuclear measures." Clearly, the nuclear jitters are back and, should global politics continue traveling on its current precarious route, America will have them bad throughout the early 1980s.

Should that happen, one can assume that the movie industry will once again rally 'round the nuclear issue: producing atomic war-related films that will caution, inform and frighten moviegoers worldwide. During the 1950s and early 1960s, Armageddon-inspired movies were very much in vogue, dishing up both profundities and perversities in the name of right-thinking intellectualism. During those years, Hollywood reasoned that no one really wanted an atomic war. Yet nearly everyone was fatalistically captivated with the horrific notion. So the movie machinery cranked out pictures that gave the public what they wanted. Unfortunately, what the public wanted, for the most part, was optimistically moralistic pap. What they should have gotten was the cold, hard reality of nuclear holocaust and the implicit horrors following it.

The inspiration for the spate of nuclear war films came in the mid-1940s. On August 6, 1945, the United States of America dropped an atomic bomb with the explosive equivalent of 20,000 tons of TNT on the Japanese town of Hiroshima. Three days later a bigger and more powerful A-bomb was dropped on the

city of Nagasaki. The destruction of these two metropolises yielded the most terrifying wartime tableau ever concocted by humanity. Bodies and buildings, gnarled and twisted, stretched for seemingly endless horizons. Once-fertile landscapes stood charred beyond recognition. The world had entered the Atomic Age.

The citizens of the United States reacted to the A-bomb blast with a strange mixture of patriotic zeal, puzzlement and revulsion. Something big had happened. Something horrible, perhaps. But something important. World War II, for the Japanese, was over.

Hollywood, taking its cue from the headlines, was ready to capitalize on the "true" story of the atomic bomb within a year. *The Beginning or The End* (MGM, 1946) was treated as a pseudo-documentary, allegedly filmed to teach the public about both the atomic bomb and this newly touted Atomic Age. The film's publicity campaign was lurid, to say the very least, with "TOP SECRET" slash-lines appearing over erroneously designed replicas of the "bomb." In order to find out just what this new super-weapon was, a curious citizen had to fork over the price of a ticket.

Fact and fiction were uneasily blended in the movie's somewhat melodramatic plot, with a young scientist (Tom Drake) wrestling with both his conscience and his overtaxed IQ in every other scene related to the bomb. (Prompting *Movie Life* magazine to comment: "The young scientist indicates to his unhappy wife that he'd be home for dinner more often if it weren't so darned hard to figure out this chain-reaction stuff.")

If the fictitious part of the film wasn't taxing enough, the supposed factual sections certainly were. Real life figures were portrayed by actors in twisted pages of history which reduced the development of the A-bomb to nothing more than another wartime act of scientific heroism. (Dialogue be-

tween a worker and an officer: "Is it true that if you fool around with this stuff long enough you don't like girls anymore?" "I hadn't noticed.")

The moral implications of dropping the bomb on Japan were nicely skirted. The young scientist dies of radiation poisoning but not before saving his buddies from a premature detonation. The bomb is built. The Atomic Age is ushered in. All is right with the world... except in several key areas of Japan.

By 1950, the scientific dream on the screen was turning a bit sour. Britain's *7 Days To Noon* showed nuclear scientist Barry Downs giving way to the pressures of his job and holding all of London at bay with a nuclear device.

With the increasing tensions brought about by the Cold War in the years following World War II, the public's fascination with atomic weaponry gradually changed to a feeling of immense dread. The U.S.S.R. developed its own A-bomb in 1949 and, by the 1950s, the world was beginning to envision the unthinkable... global destruction caused by political squabbling.

Accordingly, the movie industry turned its attention on the final war. Interestingly enough, very few right-wing, jingoistic ventures into the possibilities of nuclear warfare were produced although patriotic fervor ran high during the Cold War years. Most of the movies released offered ultra-moralistic, well-intentioned messages. The majority of the motion pictures dealing with the subject were also decidedly unrealistic, avoiding at all costs the horror intrinsic to real nuclear encounters: the charred flesh, the lingering radiation effects, the scorched earth, and concentrating, instead, on the more symbolic elements involved.

*Five* (Columbia, 1951) was the first motion picture to actually deal with the after-effects of a global war and, as such, is laudable. Factually inaccurate and totally fantastic in terms





London becomes a parched wasteland in Val Guest's eerie *The Day The Earth Caught Fire*.



New York City is laid to waste by commie menaces in the jingoistic *Invasion U.S.A.*



Arch Oboler's *Five* was the first movie to deal with a post-nuked civilization.

of plot, *Five* was also the first of the nuclear-allegory movies: a genre which underscored philosophizing and summarily dismissed scientific accuracy in favor of symbolic action.

In this offering, filmmaker Arch Oboler placed the last five people on the face of the Earth after the holocaust (a white college grad, a pregnant woman, a black bank worker, a white collar worker and a racist) in a single house and let them bicker and battle it out for the sake of humanity. Representing different facets of society past, the quintet soon erupts into periods of small scale warfare. By the film's finale, only the college grad and the young woman, who has long lost her child, are left to roam the Earth a la Adam and Eve.

*Invasion U.S.A.* (Columbia, 1953) was a fairly shoddy attempt to cash in on the cold war jitters. A group of barflies watch the destruction of the Earth on the saloon's handy TV set. As it turns out, World War III is all a dream. The customers have been hypnotized by mesmerist in residence Dan O'Herlihy who just wanted to show them what *could* happen if things should get out of hand.

Robert Aldrich's 1955 spy thriller *Kiss Me Deadly* (United Artists) was standard secret formula stuff with a radioactive pay-off capable of frightening even the most pro-science movie buff. A briefcase containing radioactive material is opened in haste by one of the film's characters. She promptly bursts into flames. Instant A-blast.

While some producers attempted to grapple with the atomic war issue somewhat intelligently, others saw it as a perfect vehicle for a spate of science fiction horror films. An army of atomic-energy-sired-mutant movies exploded onto the screen during the 1950s and still keep on coming today. The plotlines usually concerned some horrible, giant thingie that was either awakened or created by some sort of atomic fiasco. Among the best known horrors were *Them* (Warners, 1954), *Godzilla* (RKO, 1956), *The Giant Behemoth* (Allied Artists, 1959), *The Amazing Colossal Man* (AIP, 1957) and *The H-Man* (Columbia, 1959).

Some science fiction horror epics attempted to mix their monsters with morality, coming up with such end results as *Captive Women* (RKO, 1952) wherein the mutants battled Norms over the hands and other physical attributes of show-girl type citizens of the nuked-out city of New York circa 3000.

Slightly more ambitious was *World Without End* (Allied Artists, 1956). A rocket jumps through time and deposits its modern-day astronauts in the post-Armageddon Earth of the 26th century. There, they help the wary cave people fight off a bunch of multi-eyed mutants by introducing them to such 20th century notions as love, peace and bazookas. On a similarly myopic slant was Roger Corman's *The Last Woman on Earth* (Filmgroup, 1960) which portrayed the last few survivors of the final cataclysm stumbling around a Pacific island and lapsing into both violence and vile poetry.

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1958's *Teenage Cavemen* (American International) was a low-budgeted, high-ideaed potboiler detailing the attempts of a teenage caveman (Robert Vaughn) to discover what is hidden in the off-limits "forbidden zone." Boy, does he find out. Unbenownst to our caveboy, his peers are contemporary humanity's future ancestors and the verboten territory contains the last remnants of a pre-nuked Earth civilization.

During the mid-1950s, the science fantasy approach to nuclear chills took precedence over the semi-realistic attempts. By the end of the decade, however, Russian-American competition reached a heightened state and once again, nuclear nervousness reigned supreme. The motion picture world, in like suit, began to mirror the pessimistic zeit geist.

*Hiroshima, Mon Amour* (Zenith International, 1959) is probably the most personal and, as such, most effective of all the atomic warfare films. The unsettling Alain Resnais film combines horror with hope and fiction with factual footage of the city of Hiroshima—presenting not only the re-birth of the metropolis but of a pair of World War II survivors.

A French actress in *Hiroshima* to make a film about peace has an affair with a Japanese architect. Their passion triggers memories in both their minds. She recalls a doomed tryst with a Nazi soldier in her home of Nevers, France. The romance ends in death and public humiliation. He recalls the horrors of Hiroshima past. Both parties, through their mutual feelings, exhume and, finally, exorcise their past. Both the couple and the city itself will now rebuild for the future.

*The World, The Flesh and the Devil* (MGM, 1959) is an anti-nuclear statement

through default. Based on an old science fiction tale by M.P. Shiel, "The Cloud," the movie proffers a somewhat stultifying scenario of the lives led by the last three survivors of a war which uses radioactive salt to dissolve the population of planet Earth. The screenplay resembles *Five* minus two. A black man (Harry Belafonte) encounters a white woman (Inger Stevens) in a deserted city. The two grow close. Love may be in the offing. Suddenly, a third element, a white bigot (Mel Ferrar) appears and, before long, the two men are vying for the hand of the lone female. In the nick of time, the trio realizes that, in terms of the future of humanity, they are *it*. All three stroll into the sunset proving, if nothing else, that a post-holocaust world will be a shade more liberal than the pre-holocaust one of 1959.

*On the Beach* (United Artists, 1959) offered an effective, if somewhat saccharine, look at the last days of humanity. Set in 1964 after the final war, the film focuses on the last bastion of humanity as yet unaffected by the resulting radiation... Australia. As the all-consuming cloud of radioactivity slowly makes its way toward the country, the citizens attempt to live their lives as normally as possible realizing that death is at hand. An American submarine caught in that area makes a last ditch, optimistic try at contacting survivors in America. When the mission fails, they sail off into oblivion. The people of Melbourne commit mass suicide rather than experience the painfully slow rigors of radiation poisoning.

In *The Bed Sitting Room* (United Artists, 1960), civilization ends not with a bang but with a simper. In director Richard Lester's bizarre version of Spike Mulligan and John

Antrobu's radio play, the world collapses into a permanent state of madness after the war to end all wars. In one family, Dad (Arthur Lowe) mutates into a parrot (of sorts), Mom (Mona Washbourne) becomes a chest of drawers and daughter Penelope (Rita Tushingham) romps about the land some 16 months pregnant (with what?). A nurse (Marty Feldman) wants to wallpaper people's wombs so that no one will want to leave. The last remnants of government proper, a police Inspector and a Sergeant (Peter Cook and Dudley Moore) demolish the few buildings still left standing in order to give the Enemy fewer targets during World War IV and dignified Lord Fortnum (Ralph Richardson) mutates into the film's title room. Nearby, the underwater Vicar (Jack Shepard) patrols the submerged St. Paul's Cathedral religiously. In its own decidedly black-humored way, *The Bed Sitting Room* points out humanity's tragic habit of hanging on to any and all traces of the past no matter how illogical or harmful that practice may be.

One of the most disturbing of all atomic holocaust-spawned productions was Joseph Losey's *The Damned* (1961); a movie grossly mishandled by Hammer Films, pulled from distribution and massacred in the editing room by company goons. Finally released in England in 1963 (stateside release occurred two years later in an even further truncated form entitled *These Are The Damned*), *The Damned* details a rather chilling project instigated by the British government.

A group of children are purposely contaminated by radioactivity and are nurtured in an underground environment. They are destined to be the future race of Britons; impervious to the long-range effects of atomic

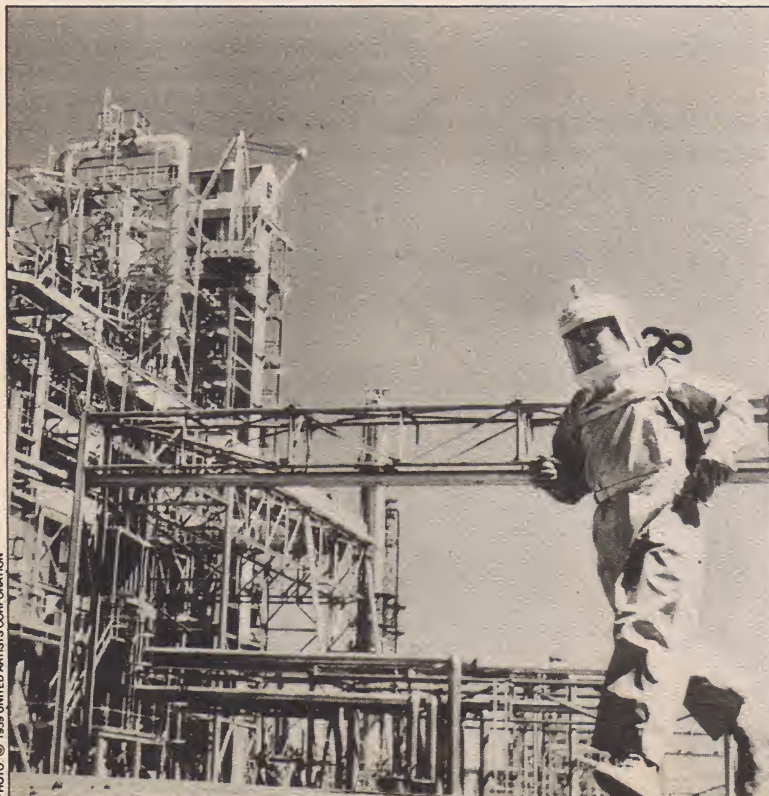


PHOTO © 1959 UNITED ARTISTS CORPORATION

In *On The Beach* a handful of survivors attempted to find life after World War III.



PHOTO © 1963 UNITED ARTISTS CORPORATION

*Ladybug, Ladybug* was a masterful look at nuclear jitters.





Dr. Strangelove (Peter Sellers, center) discusses life after the impending holocaust.

attack. They will be able to live effortlessly topside after the inevitable Day of the Megadeaths. The children, unmindful of their fate, are discovered by adults Simon (MacDonald Carey) and Joan (Shirley Anne Field). The children unwittingly contaminate the adults as the pair attempts to free the tykes from their mysterious prison. Aided by motorcyclist King (Oliver Reed) and sculptress Freya (Viveca Lindfors), the duo arrange the jailbreak. It ends in failure. The children are recaptured by radiation-suited British agents. Freya is killed by a government man. King dies at the wheel of his car, passing out from radiation poisoning. Joan and Simon sail off into the sunset, contaminated and dying. They are pursued by government helicopters and sharpshooters. Armageddon games will continue.

By the early 1960s, the melodramatic aspects of atomic warfare were being superseded by scenarios portraying humanity as the hapless prisoners of technology gone wild. Director Val Guest's *The Day The*

*Earth Caught Fire* (Universal-International, 1962) is a low-budgeted, low-keyed affair that is rife with horrific meaning. When America and the Soviet Union simultaneously set off two 50 megaton hydrogen bombs at the north and south poles, they shift the Earth's orbit some 11 degrees and send it heading closer to the sun. The knowledge is officially kept from the public but a reporter (Edward Judd) and his lover (Janet Munro) break the story.

Soon the Earth is broiling. People are rioting in the streets. The end of the world is at hand. In a last ditch effort to save the globe, all the major world powers unite and set off four nuclear bombs at the equator in an attempt to stabilize the Earth's orbit. The film ends with the reporter glancing at two headlines planned for the morrow's morning edition: "Earth Saved!" and "Earth Doomed." The world's fate is left to the mind of the moviegoer.

*Panic In The Year Zero* (AIP, 1962) reduced nuclear survival to the Audie Murphy level. Following the nuking of Los Angeles, a

father (Ray Milland) and his family (wife Jean Hagen and kids Frankie Avalon and Mary Mitchell) find themselves stranded in a California populated by crazed goons. The good folk, making their way to a safe section of the state via van, find themselves shooting and maiming with the best of them in a constant battle for survival. Sis is graphically gang raped. But dad and sonny pay the thugs back with interest. Junior finds true love (a would-be rape victim) and is almost killed. A cynical country doctor turns savior, reviving the boy. "You know," dad says, "watching you work is like raising your head up out of the mud and slime and seeing civilization again." Thoughts to live by.

One of the most jarring of all nuclear war films (along with *The War Game* and *Hiroshima, Mon Amour*) is the neglected gem *Ladybug, Ladybug* (United Artists, 1963), Frank and Eleanor Perry's mini-masterpiece.

In it, a group of schoolchildren are sent home from their rural schoolhouse following a sudden air raid. No one is quite certain whether the alert is real or not, whether nuclear attack is imminent. The children, in their confusion, begin to mimic the behavior of the adults in their lives. Selfishness, heroism, greed and pessimism come to the forefront as the youngsters brace themselves for the war.

In one of the most heartbreaking scenes, a girl, refused admittance to a bomb shelter lorded over by a calculating and jealous peer, climbs into an abandoned refrigerator for safety. Moments later, her young boyfriend frantically runs through the junkyard, looking for her. A passing air force jet sends the boy into a paroxysm of hysterics. He is screaming senselessly. She is quietly dying nearby. War is clearly a game for adults.

1964's *Fail Safe* (Columbia), based on the best-selling novel, does little to play up the horror of nuclear warfare but, rather, underscores the awesome responsibility placed upon the men who are asked to monitor the nuclear weaponry around the world. When a group of bombers equipped with nuclear



*Fail Safe's* President (Henry Fonda) is forced to destroy New York.



The reality of post-nuclear existence is portrayed in *The War Game*.



warheads is accidentally dispatched on a mission to destroy Moscow, the President of the United States (Henry Fonda) does all in his power to call them back, even going so far as to shoot some of the planes down. One plane, however, does get through and destroys the Russian city. In order to avoid an all-out war, the President himself must voluntarily destroy New York with a nuclear bomb.

*Dr. Strangelove Or: How I Learned to Stop Worrying and Love the Bomb* effectively satirized not only the technology of nuclear warfare but the bureaucratic webs needed to launch such a disastrous event. Stanley Kubrick based this 1964 (Columbia) film on a serious novel by Peter Bryant called *Red Alert*. It told of an insane U.S. general who, without consulting the President, launched a nuclear attack on Russia. In *Strangelove*, scripted by Kubrick, Terry Southern and Peter George (aka Peter Bryant), the threat of atomic war is lampooned but remains a frightening specter nonetheless. Sterling Hayden is crazed General Jack D. Ripper who is willing to push the country into World War III in order to rid the world of a non-existent red menace.

A group of level-headed government officials, led by Captain Mandrake (Peter Sellers), General Turgidson (George C. Scott) and President Muffley (Peter Sellers) tries to find the code needed to recall Ripper's bombers. Ripper commits suicide rather than reveal the information. Eventually, the code is broken and the planes recalled. One bomber, however, piloted by Major T. J. "King" Kong (Slim Pickens) is radio-less and heads for Russia undaunted. Kong blows up Moscow while, stateside, Dr. Strangelove (Sellers) explains to the President and his men just how they can all live safely underground until the radiation from World War III wears off. If the world does indeed end cataclysmically in the foreseeable future, it will probably follow Kubrick's scenario rather closely. (Has anyone been listening to the rhetoric on Capitol Hill of late?)

*The War Game* was filmed by the BBC in 1965 as a television presentation. Proving too controversial for TV, it was subsequently released theatrically by Pathe Contemporary Films. Written and directed by Peter Watkins, this short (50 minute) black and white offering strings together a myriad of truly jarring images, approaching the subject of nuclear attack in a pseudo-documentary manner. Using all non-professionals for the cast, *The War Game* presents a pessimistic panorama of an England emerging from the turmoil and horror of a nuclear holocaust. Deformed corpses litter the streets. Fires spread unchecked throughout the cities. Looters riot. The remnants of the police force try to protect what remains of society. *The War Game* is the closest thing to a post-nuclear reality ever filmed. It is also the least shown of all nuclear-oriented films. It won an Oscar upon its release in the states in 1966.

Nuclear technology itself seemed to reign supreme on the screen during 1965. That year's *The Bedford Incident* (Columbia) was an ICBM missile-laden cat-and-mouse tale

(continued on page 67)



*Logan's Run* after-the-bomb scenario did not bode well for the world of literature.



*World Without End* featured multi-eyed manic mutants in its post-holocaust society.



Harlan Ellison's *A Boy and His Dog* made the leap from literature to celluloid in 1975 with the help of actor/director/screenwriter L. Q. Jones. The basic premise of the story was that of survival in a post-nuclear world. Main character Vic (Don Johnson) made his way across the barren wastelands with the aid of telepathic pup pal Blood (the voice of Tim McIntire). Rather than offering a realistic depiction of society gone to seed, the film concentrated on the more symbolic side of humanity on its knees. En route, Ellison and Jones managed to inject healthy doses of adventure, pathos and sharp, needling humor.



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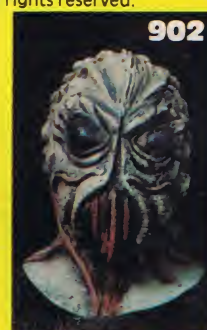
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# Edward Blair-Wilkins

Edward Blair-Wilkins, the young English artist whose robot paintings are featured in this issue's Gallery, would be the last to deny that he is a proponent of science fiction. "Science fiction as a catalyst triggers the grandest sense of wonder, injecting mystery and curiosity into the usually static human mind—introducing original and lateral thought," he asserts. "SF is productive literature, provocative, ever-changing; it is fun and stimulating—like fresh air. Science fiction fans are probably the *most* human people on this planet—but at the same time the most alien. From this paradox derives the worldview of science fiction people—fans, writers, artists, etc.—and it is a unique viewpoint from space/time and every which way. My painting and drawing of this subject matter is my way of experiencing a hopeful future."

Blair-Wilkins pauses and smiles. "I have strong feelings about SF," he admits. "I would echo a certain up-and-coming writer who said that 'science fiction is the *only* contemporary literature' and that 'people who don't enjoy science fiction have something wrong with them.' I heartily concur with this wisdom. I would certainly not consider myself a fanatic or obsessive where the genre is concerned, but I collect SF literature, media and other artifacts, and my present library consists of a meager 3,500 items and threatens to take over the house!"

It is perhaps for that reason that the Liverpool-bred painter has moved to Germany. More likely,



it is because most of his futuristic art is published there. However, he is not totally unknown either in his own country or on this side of the Atlantic. He has had a number of exhibitions in England and won prizes for his work at a recent science fiction convention in Boston.

Blair-Wilkins applies his futuristic leanings to more than his art. He also has very strong opinions

on the world situation. "There is absolutely *no* future for a humanity comprising the attitudes and goals of a totally synthetic and artificial society," he says, "as seems to be the case with us as we move into the 1980s. Apathy, novelty and transience rule both our behavior and intellectual processes. Imagination and achievement are chained in protest to the grinding wheels of misdirected

and universal commercialism, whose only target is the subjugation of imaginative innovation whenever those innovations run at cross-purposes to vested interest. This attitude will lead to an irrevocable and universal steady-state totalitarian system—or nuclear exchange."

And the answer to these problems? "Colonize space," he says promptly. "Expand the horizon to the pioneering exploration/exploitation of the 'high frontier.' Bob Heinlein said, 'Humanity should not put all their eggs in one basket.' That warning is the most important indicator of the times that must approach. We've only got to choose between probable annihilation and definite survival. Is there a more important issue than that? I don't think so."

Blair-Wilkins warms to his subject. "The space program, the greatest adventure of all, has been deliberately crippled, hamstrung and rendered nearly impotent by the misguided and idiotic policies of uncaring and unconscious dinosaurs like William (Darth) Proxmire; and the trend continues. These archaic senescent fools cannot learn from history. They are not aware of the present effects of future shock, for they do not care about their descendants and have no interest in the future of their own species. Amazing, isn't it?"

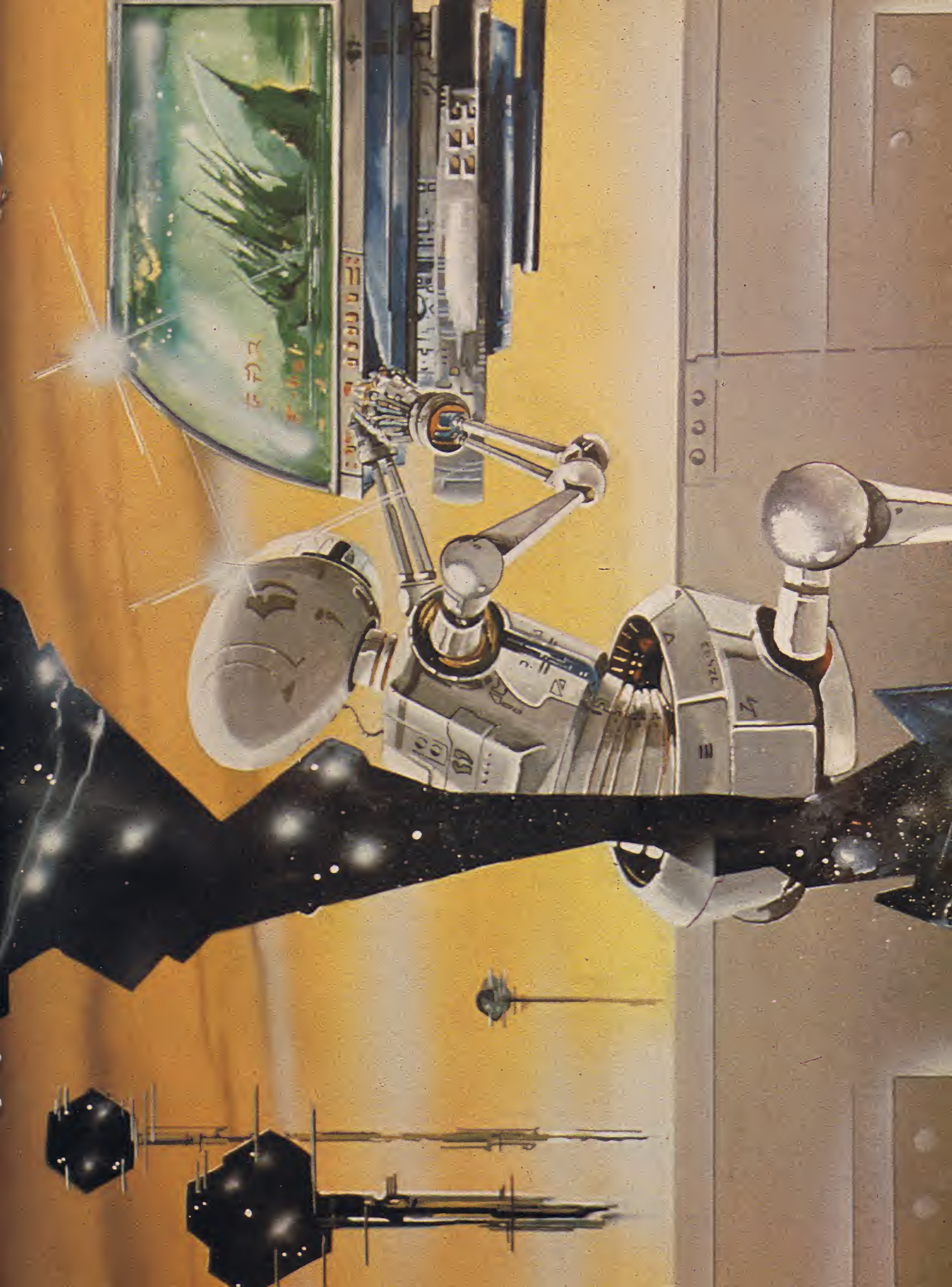
Edward Blair-Wilkins, space artist and space enthusiast, sighs and looks into the future. "It is time," he says, "that this first step out of the cradle was made—the race of mankind has grown too big for it." **E**

Centerspread: "Crack in the Sky" © 1980 by Edward Blair-Wilkins













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# The Gifts of Recombinant DNA

The genetic engineering revolution has begun—and the bounty from the laboratory is already translating into a brighter future on many fronts.

By W. A. THOMASSON

**Y**ou might call it a 'growth' industry," punned *The New York Times* in a recent article about genetic engineering. And indeed, if the headlines are any indication, the once esoteric science of recombinant DNA is rapidly entering a new phase of commercial exploitation. More than \$150 million in venture capital has been invested in what some are now calling a new scientific-industrial revolution.

Scientists have learned that by transferring DNA—the molecule that determines a cell's genetic destiny—into a lowly bacterium such as *E. coli*, that bacterium can be transformed into a biological factory capable of producing otherwise scarce and valuable chemicals. Already three vital products of living human cells—interferons, growth hormone and insulin—have been manufactured by bio-en-

gineered microorganisms. These breakthroughs point to a day when unlimited supplies of these life-saving substances will be available at a cost affordable to anyone who needs them.

Far from the fearful expectations that scientists would unleash mutant life-forms on an unsuspecting public, the new techniques of gene-splicing are now being put to use in a variety of highly practical ways. And although the requirements of the Food and Drug Administration will necessitate a certain amount of time lag before the pharmaceutical products reach your corner drug store, a variety of industrial firms are gearing up to cash in on the gold at the end of the DNA rainbow.

Firms ranging from corporate giants like Dupont to such small "high-tech" companies as Cetus and Genentech in the San Fran-



cisco Bay area are betting commercial products derived from this technology will be on our shelves by mid-decade. The only question in their minds is who's going to be first, and when.

What *product* will be first seems to have an easier answer: human insulin. Insulin, of course, is the hormone diabetics need to stay alive. There is thus an established, multi-million dollar market for any insulin that can be produced more cheaply than we now extract it from animal pancreases. And since the drug companies' experience with antibiotics has shown them microorganisms can make things cheaply, they are understandably pushing this research as fast as it will go.

It is now in fact rather well along. Three different laboratories have successfully inserted into the intestinal bacterium *Escherichia coli* genes which code for an insulin identical to that produced by our own pancreases. One of the laboratories is Genentech, which as early as the spring of last year had already begun the large-scale experiments necessary to develop methods for commercial production. (And Eli Lilly, which will actually produce and distribute the insulin made by Genentech's technology, has simultaneously begun clinical tests of the material.) Genentech's decision to press ahead with large-scale experiments was particularly notable because they did not clear their procedures through the National Institutes of Health Recombinant DNA Advisory Committee. They thus ignored a long-standing informal agreement that, even though NIH has no legal authority to regulate industrial research, firms working with recombinant DNA would abide by the rules governing academic laboratories. Their action was clearly prompted by fear the trade secrets included in an application to the Committee would reach their competitors; it was not until six months later that procedures to insure confidentiality were developed. Even though company president Robert Swanson points out that Genentech's plans had the approval of both NIH director Donald Frederickson and Dr. William Gartland, head of the NIH Office of Recombinant Activities (the "violation"—if that term can be used in connection with an agreement that has no legal standing—was thus purely procedural), the fact remains that their decision to go ahead without Committee approval carried an element of political risk. That they did so underlines their feeling that the commercialization is so close even a half-year delay could make a significant difference.

Yet if Lilly and other pharmaceutical companies are interested in this insulin because it is cheap, there are thousands of diabetics for whom the fact that it is human insulin will be literally life-saving. Each animal insulin—beef or pork or whatever—differs slightly from human insulin. While this does not alter its effectiveness as a hormone, it does enable the body's immune system to recognize it as a "foreign" protein; antibodies can thus develop which render that particular insulin ineffective. The victim must then switch to another type of insulin—for example, from

beef insulin to pork. Unfortunately, it is quite common for those who have developed antibodies to one insulin to develop them to others also. Eventually they may have antibodies to every insulin available. The American Diabetes Association has no idea how many people die each year because of this, but it is certain that for them human insulin is a bargain at any price.

Yet human insulin is by no means the only contribution recombinant DNA can make to our future health. Most of us are likely to be far more interested in the prospect of safer and cheaper vaccines. Our present vaccines are made from whole viruses, either killed or attenuated so they no longer cause significant disease. However, not only is there the remote

Indeed, as Dr. Cape points out, this may be typical of many potential recombinant DNA products. In his words, "The ability that recombinant DNA provides to produce human proteins is discontinuous, in the sense that up to now, with very few exceptions, there has been no way at all to produce human proteins at reasonable cost." Consider, for example, the case of children with inadequate pituitary function; they often become midgets due to lack of growth hormone. Unfortunately, only human growth hormone will do; animal hormones are ineffective. But the only present source of human growth hormone is cadavers, and there is simply not enough to meet the need. The only hope for these children is to construct a



but real possibility that some slip-up may let a living, virulent virus reach the market, there is the even more serious difficulty of protecting the workers who grow the virus in the first place. This is particularly severe with such highly infectious viruses as that which causes hepatitis B (serum hepatitis)—which is why Dr. Roland Beers of Miles Laboratories thinks it will not be many years before we see a hepatitis vaccine containing only the proteins necessary to induce immunity. Since these proteins will be produced by bacteria created by recombinant DNA techniques there will be no virus involved at all, and no possible danger to either worker or patient.

But Dr. Ronald Cape of Cetus suggests another vaccine may be even more important. Of all the venereal diseases now sweeping the country, none is growing faster than genital herpes. Yet herpes virus has been shown to cause cancer in experimental animals; so as Dr. Cape says, "you know there is no way anybody is ever going to approve shooting live or dead herpes virus into anybody...that's a loser from the beginning." Thus, only by the use of recombinant DNA techniques can we have any herpes vaccine at all.

bacterium that produces the hormone. Fortunately, this has already been accomplished; commercial production is a matter of time.

But insulin, growth hormone and vaccines all pale into insignificance to the production of interferon. As Drs. J. K. Dunnick and G. J. Galasso said at the 1977 Interferon Workshop, "Interferon has been shown to hold promise for treating RNA viruses in man, including influenza, rhinoviruses [colds], and rubella [German measles]; for treating DNA viral infections, including hepatitis B, cytomegalovirus, herpes, and varicella zoster [chicken pox]; and also for treating certain metastatic diseases [cancers] such as Hodgkin's disease and osteosarcoma." It has shown promise, but has never been conclusively proved effective. The problem is, again, that only interferon from human cells is effective. There is accordingly very little available, and what there is is damnably expensive. Only recently has the American Cancer Society appropriated \$2 million to purchase interferon—enough to test in 170 cancer patients, at an average cost of \$12,000 per patient treated. As Drs. R. Z. Lockart and E. Knight remarked at the 1977 workshop, "Herein lies the catch-22 with



interferon and disease. There is a need for cheaper interferon so that more clinical testing can occur and there is a need for a demonstrated use of interferon to spear the search for cheaper interferon... Hopefully, one or the other will occur before enthusiasm for the clinical use of interferon dies."

Only last January a Swiss-based company, Biogen S.A., announced that their scientists have engineered a bacterium which produces interferon in quantity. The effectiveness of interferon still remains to be seen, but now at least the medical field will soon have less expensive and greater amounts of the substance with which to test their theories: that interferon may be the cure for the common cold as well as cancer!

As strange as it may seem, however, the first commercial product made through genetic engineering might not be any of these exciting pharmaceutical products. They all require FDA approval—an often drawn-out process—before they can be marketed. There is thus a good chance that the first product to actually reach the market will be an industrial chemical. Cetus, for example, already has an organism that converts ethylene, a major petrochemical, to ethylene oxide or ethylene glycol (antifreeze). The question, of course, is whether it can do so more cheaply than present industrial processes. Yet even if this particular organism cannot, others may. As Cetus's Cape points out, microorganisms typically function best near room temperature; they do not require the high temperatures and consequent ever-spiraling energy costs typical of our present processes. Neither do they require catalysts based on scarce metals like nickel and platinum (if you haven't kept up with the financial section of your newspaper you may be surprised to note that the price of platinum has been going up faster than that of gold). Furthermore, they tend to be relatively specific: they can pick one starting material out of a mixture and, as a rule, convert it into a single product. The latter can be a major advantage to a company that must clean up its waste stream before discharging it to the environment. And finally, the renewable, biomass-based materials that many believe are the resources of the future are precisely the preferred starting points for microbial processes. It seems as though the recombinant DNA revolution may have arrived just when we need it.

The same may be true for mineral resources. It's a truism that our rich mineral ores are being exhausted; we must constantly find ways to utilize ores with lower and lower metal concentrations. Here too recombinant DNA can help. The copper companies already use bacteria to leach residual metal from tailings and ores that would otherwise be too poor to process. Other microorganisms and plants are known that specifically concentrate metals, even uranium, in their tissues, and do so from soils we would never dream of calling ores. Yet use of these organisms has been limited, to say the least, because they accumulate too little metal to make it worthwhile processing them. And this, as Dr. Cape points out, is where genetic

engineering comes in. There is nothing easier for recombinant DNA techniques than to increase the efficiency of an existing metabolic process. It may not be—quite—in this decade, but we are very likely to have "magnesium farms" and "uranium farms" in our future.

The food industry too may soon feel the impact of gene-splicing. Ignore engineered improvements in the microbes now used to make everything from cheese through beer to bread, as we have already ignored what Dr. Beers calls "the likely initial breakthrough" in pharmaceutical products—that is, improvements in the microbes that produce penicillin and other antibiotics. Rather, consider that the crucial components of most foods are proteins, and that, as Dr. Cape says, "We know how to make any proteins we want now because we know how to play with the genes; we can synthesize the genes ourselves and make what we want. And consequently we [Cetus] have programs to make specific [proteins] that may be terrific food

additives—designed at the gene level." While Dr. Cape can't be more specific about his plans, the possibilities are not hard to see. Bread, for example, might have the high-quality protein we now get only from meat. It might taste like meat, too, if that's what we want. Looking ahead, John Varley's "banana meat tree" (from *The Ophiuchi Hotline*) may be a lot closer than anyone realizes.

New foods, hormones, vaccines, energy-efficient non-polluting industrial processes, cures for cancer and the common cold—all within a decade or two. What lies further down the road? What will our society be like when the Age of Genetic Engineering really arrives? It's anybody's guess.

But one thing is for sure, according to Dr. J. Leslie Glick, president of the Genex Corporation. "The possibilities are so vast that it is impossible to predict the ultimate scope of the impact of recombinant DNA technology," he notes. "Suffice it to say that I believe we have observed merely the tip of the iceberg."

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Will the world ever catch up with the Residents? It hasn't happened yet, and there's a slim chance that it will happen in the '80s. They have said about themselves, "We are a band of the present making music for a world living in the past." Many of their music-making techniques and much of their frivolous attitude toward the record industry and the record-buying public have only recently been "discovered" by other artists. They were using tape manipulation and other recording studio tricks to mutilate rock classics long before the currently fashionable craze. Take as an example their grinding, demented version of "Satisfaction" which preceded Devo's treatment of the song (which probably started the trend) by a year.

Throughout the '70s, the Residents busily followed their own direction, occupying an outer fringe all their own. Their music defies any description and/or definition. Listeners can easily point to bits of it and say, "there's some Frank Zappa here," and "this shows too many hours of listening to Captain Beefheart's *Trout Mask Replica*," but glib, all-inclusive phrases just don't exist to describe the Residents' music. Their sound could be called "futuristic," but only if by that you mean different from anything that came before it and anything going on around it. Sometimes progress isn't always in the obvious "forward" direction (acupuncture is a good example). The primitive power in the Residents' music, tempered and colored with modern recording technology, is what keeps them at the forefront of the music world. They mix the avant-garde with the neanderthal for the truly progressive music of the 1980s.

Obviously this stuff isn't easy listening music. It isn't for those who need the security of the standard rock beat to tap their toes to. Or for those whose ideas of melody and song structure are limited by what they hear on the radio and in department store elevators. Residential music is for those adventurous few who demand more from what they listen to than pre-programmed response patterns. As the band themselves have pointed out, their music is *by* alienated people, *for* alienated people. It's directed at those who've never been comfortable with what they've been spoon-fed by the fuehrers of popular culture.

Who are the Residents? Good question. They've been called variously, "the weirdest rock and roll band in the world," (weird they certainly are, but whether what they do can be considered rock and roll is debatable), the makers of "the most determinedly repellent music I've ever heard" (as one rock critic described their "Satisfaction"), and, not surprisingly, their music has been described by all the last-resort adjectives of writers desperately grasping for something (anything!) to contain and/or justify their confusion: "demented," "sick," "unlistenable," "intellectual twaddle," and, those old favorites, "great art" and "pure genius."

The Residents are apparently four people who, in the course of the past eight years, have recorded and released on their own label

# MEET THE RESIDENTS

By LOU STATHIS



(Ralph Records, from the euphemism "to call Ralph," or to vomit) six albums, five singles and two extended play singles; while also appearing on four other albums and three singles as either partial contributors, producers or back-up musicians.

But *who* are they? What are their names? Which of them plays the lovely piano on their first album, *Meet The Residents*? Where do they come from? What do they think of the world political situation? Do they shave their armpits? Do any of them have cute smiles and dimples on their cheeks? Well...there's a bit of a problem here. The Residents aren't individuals as far as their public image is concerned—they're only a group of music-makers. No names, no faces, no background information, no personality profiles, almost no personal or concert appearances (four in the past eight years, all unannounced and heavily camouflaged). Just the Residents. Their cultivated obscurity is their image, their artifice part of their art. And the few facts that *do* find their way out are highly suspect (do they indeed come from northern Loui-

siana?). They hide behind a cleverly constructed facade of dadaist dismissal. They have no use for the standard, gimmick-laden, publicity-mongering apparatus of the record industry. Instead, they have twisted the industry's techniques to suit their own perverse sense of humor, creating a whole new area of expression while tagging it with a sweeping gesture of contempt.

Take the previously mentioned *Meet The Residents*, released first in 1974. As you might suspect from the title, there is a certain Beatle motif here. The cover is a duplication of the Fab Four's first LP jacket, albeit with some changes—the physiognomies of the lovable mop-tops have been hideously defaced, graffiti style, with horns, crossed eyes, fangs, dripping tongues and the like. The album was repackaged three years later upon threat of lawsuit from the Beatles' record company (the revised edition is only slightly less blasphemous). Turn next to the band's third album, *Third Reich 'n Roll* (actually the second to be released, in February 1976, two years before the second, *Not Available*, saw





They're young. They're suave. They're The Residents. Not exactly your Beach Boys concept of West Coast rock and rollers but... At left, the myopic mob takes a short sightseeing stroll at San Francisco's Golden Gate Bridge. Top of page: It's party time for mutant mavens as the fun-loving Residents stock up for a wild weekend! Right: The Residents are seen peering from atomic shopping carts in this shot from their full-length (uncompleted) film, *Vileness Fats*. Among the group's boss LPs are *Eskimo*, *Third Reich'n Roll*, *Not Available* and *Fingerprince*.



PHOTOS: © 1980 RALPH RECORDS/THE CRYPTIC CORPORATION

print—don't ask *me* to explain), perhaps the most well-known of the Residents' records. The cover, front and back, is liberally littered with swastikas. Occupying center stage on the jacket's front is Dick Clark dressed as Adolf Hitler. In his right hand he's holding a carrot, and he's surrounded by dancing couples in various modes of dress—all wearing Hitler's face. These charming bits of calculated outrage are not, however, meaningless nihilism of the adolescent rebellion/Sex Pistols variety. It becomes obvious, after listening to the records and re-examining the packages, that the Residents are in the business of carefully manipulating the dominant symbols of our culture. With the inspired application of a satirical scapel, they proceed to disembowel the awesome cultural fascism they see in American popular music.

In the course of the 30-odd minutes of *Third Reich'n Roll*, the Residents manage to demolish at least 29 top-40 hits from the 1960s—their acknowledged source material that they seem to both cherish and despise, in classic Zappa fashion. We are treated to

Chubby Checker singing "Let's Twist Again" in German, Wilson Pickett/Cannibal & The Headhunters' "Land of a Thousand Dances" done in African tribal drum style, Tommy James' "My Baby Does The Hanky Panky" sounding as brainlessly insipid as it deserves, the Doors' "Light My Fire" recited vacuously by a drug-added hippie, all the way through similarly savaged renditions of "Wipe-Out," "Telstar," "96 Tears," "Yummy, Yummy, Yummy," and a truly depraved climax of "Sympathy For the Devil" interpolated with "Hey, Jude."

It is only typical that the Residents' most recent record, *Eskimo*, is totally unlike any expectation of it given by the earlier releases. It is a bleak aural canvas swept by the sounds of synthesized wind, punctuated by deadpanned "Eskimo" chants and bits of music-drama (all described on the inner sleeve, and all of dubious authenticity). Whether it is true Eskimo music or not is as germane a question as whether they are a rock and roll band or not. It's all Residential music, music that takes time to adjust to. It requires many

listening before it can settle comfortably against your ears and reward your patience and persistence with strikingly memorable melodies, hilarious verbal tomfoolery and a refreshingly unique fusion/fission of sound and music.

The currently available Residents records are: *Meet The Residents, Not Available*, *Third Reich'n Roll*, *Fingerprince*, *Duck Stab/Buster & Glen*, *Eskimo* and the single, "Satisfaction." All are equally warped, equally inaccessible, and equally brilliant. Buy them in any order you wish at enlightened record stores in your area. If you have the misfortune to reside in Tierra Del Fuego, or someplace of similar cultural remoteness, you can write to Ralph himself at: 444 Grove Street, San Francisco CA 94102, and ask for his nifty catalog, *Buy Or Die!* (subtle fellow, that Ralph). In the words of the hitmakers themselves, "Ignorance of your culture is not considered cool!" If the Residents do indeed make music of the present, then perhaps their present just isn't the same as ours. It could be our future, but that remains to be seen. ▮



# Quo Vadis 3-D?

Three-dimensional photography is alive and well, both  
in the movie theater and in the operating room.

By DAVID HUTCHISON

**S**cience-fiction writers have made use of the concept of 3-D television and 3-D movies as background props for their stories nearly as long as the genre itself has existed. Furthermore, 3-D technology has been with us since the earliest days of the motion picture. In fact, the first motion picture ever made was in 3-D in 1889 by the English inventor William Friese-Green.

So why aren't we sitting at home watching 3-D TV in color or going to the movies and sitting in theaters experiencing widescreen, surround sound, color... and 3-D? Well, it may surprise you to learn that many people can and do.

Movies in 3-D have been exhibited sporadically with varying degrees of success throughout this century—the last big boom occurring during the early '50s. There are still a few theaters today that occasionally exhibit some of the classics (such as *Kiss Me Kate*, *It Came From Outer Space* and *Dial M For Murder*, among others) in 3-D. A few films have been made in 3-D since that time for theatrical release, notably *Dynasty*, *Ape*, Arch Oboler's *The Bubble*, Andy Warhol's *Frankenstein* and a few porno flicks. There are also quite a few companies carrying on active research in 3-D movies; companies like Stereo-Scope, Spacevision and Dimension-3. United Artists quite recently developed a dual 70mm camera system (surely the Rolls-Royce of all movie formats) and shot footage in Egypt of the pyramids and Tut's treasures under the skillful hand of Hollywood cinematographer Dick Vetter.

But very few of these more recent developments are available for public viewing, with the exception of *Sea Dream*, a very remarkable film created by Murray Lerner, a New

York-based documentary filmmaker. Produced in Spacevision (a process owned by E.M.I. Films) for Marineland of Florida, this 23-minute film in color, quadraphonic sound and 3-D has been enchanting visitors since 1978.

Marineland of Florida was created in 1937 as Marine Studios—two large tanks called "oceanariums" were built to allow commercial filmmakers the opportunity to film ocean denizens in a simulated natural environment. Soon scientists and tourists alike were streaming to the secluded oceanfront site south of St. Augustine to view the unique "windows on the sea." It became the world's first marine life attraction and has enjoyed notable success since its doors were opened to the public in 1938.

*Sea Dream*, presented in a special 444-seat theater, is part of an ongoing expansion program at Marineland. When Murray Lerner was approached by Marineland to produce a special exhibition film, one of the possibilities they had in mind was a 3-D film—perhaps because Marineland had been used as one of the locations for the 3-D thriller *Revenge of the Creature* in 1955.

Excited by the possibilities of working in 3-D, Lerner began a year-long search for the 3-D process that would be right for a film with many underwater sequences. "Out of all the processes I saw," asserts Lerner, "I liked Spacevision the best. I found it to be sharper than any other 35mm widescreen process. I did a very elaborate test that took about a month. But as soon as I began seeing footage in 3-D I knew I had what I wanted and began to get very excited."

*Sea Dream* is a nature documentary that makes excellent use of the 3-D process.

"When I started scripting *Sea Dream*," Lerner explains, "I tried to analyze the esthetic possibilities of 3-D. I don't think anyone has ever done that with 3-D before. It's usually just added to the story—like taking out black and white film and putting color film into the camera. I knew that *Sea Dream* had to be an 'experience film,' that the medium had to be the message—the fact that I was working in 3-D had to be at the heart of what I was doing."

If the reactions of the audiences since 1978 are any indication, Murray Lerner has given them an experience in 3-D filmmaking that is indeed unique. Most 3-D films of the recent past used the screen as a "window"—as if the audience were seated in a darkened room and watching the action of the film unfold through the window of the screen. Occasionally, for shock value, objects would be poked through the window into the audience's faces. Westerns were particularly noted for the sheer quantity of debris "hurled" at the audience. *Sea Dream*, however, gives the viewer a new experience. Lerner attempts to fill the space between the viewer and the screen. The film's dramatic impact is heightened considerably with so much of the action appearing to take place within an arm's reach of the viewer. Lerner enjoys playing with the audience; right at the very beginning of the film, he establishes the exciting potential of 3-D to his audience by having a frisbee come sailing over the waves, off the screen and remain floating just a couple of feet in front of the viewer's nose. It's startling and exciting and it lets the audience realize what they are in for when the frisbee dissolves into the image of a sea creature—the audience finds itself looking not through a window at the world,



Both the red/green anaglyph version and the two-projector polaroid prints are still in circulation. Below: The alien created for the film. Bottom: 3-D promotional art from *I.C.F.O.S.*



The title frame from the anaglyph print of *It Came From Outer Space*.



PHOTOS: © 1963 UNIVERSAL





PHOTO: COURTESY MURRAY LERNER

Lerner had a special camera housing modified to handle the Spacevision system for the underwater sequences in *Sea Dream*.



John Rupkalvis' setup at Communication Arts in Minneapolis demonstrating an anaglyphic 3-D image on a color TV screen. Rupkalvis has developed an anaglyphic system that retains most of the full color detail of the original scene. Most anaglyphs appear as red and blue

and are perceived through the glasses as a black and white image. Rupkalvis' system divides the spectrum between the left and right views so that the picture appears nearly full color on the printed page and in 3-D when viewed through the proper red/green glasses.

but experiencing the world projected into their midst.

Lerner comments, "I found that most oldtimers in 3-D films like to place the action 'beyond the window.' I guess they were afraid to shock the audience. It's just like the early days of regular cinematography when the cameramen were afraid of wide angle and telephoto lenses—they stuck to the so-called "normal" lenses. They all insisted on a lens that resembled the way the human eye worked and anything else was wrong. But this is an *esthetic* consideration. They didn't understand the drama of the medium. Film isn't vision. Film shouldn't seek to recreate normal human vision, because film is better than that. You are limiting yourself dramatically and artistically."

Spacevision's inventor, the late Bob Bernier, was aware that there were many technical considerations and limitations to 3-D films. Many systems in the '50s were restricted to shots that closely matched the capabilities of human vision. Spacevision seems to be good at producing unusual shots without eyestrain.

Spacevision's 3-D lens is simple to operate. The system utilizes a single 35mm camera with the Spacevision Trioptiscope lens which "sees" two viewpoints on a horizontal plane similar to one's eyes. These two images corresponding to the right and left eye view are stacked one on top of the other within the standard 35mm frame. This splitting of the 35mm frame gives Spacevision its widescreen aspect ratio of 2.35:1, which is similar to CinemaScope.

Lerner is looking forward to continuing his work in the 3-D medium. Quite a number of SF film producers and directors have seen special screenings of *Sea Dream*, which Spacevision now uses to show off its process. Even Dr. Land of the Polaroid Corp., and one of the pioneers in 3-D system development, has said that *Sea Dream* incorporates some of the finest 3-D photography he has

PHOTO: COURTESY JOHN RUPKALVIS/STEREOSCOPE





Stereonics 3-D video microscope invented by James Butterfield is used in micro-electronic manufacturing, small parts assembly, biological research and education.

ever seen. Lerner thinks that science fiction, fantasy, horror, magic and the circus are all ideal for the medium of 3-D. But Lerner maintains that whatever the genre, it should be scripted for 3-D so that it becomes a "total experience." "You have to think of the medium," Lerner maintains. "I think talking heads would be the weakest possible subject matter for 3-D. You have to pick your story for the medium."

A 3-D film is a very different experience. In ordinary "flat" films, when the camera goes to close-up, the image gets bigger on the screen. Sometimes it can be quite disconcerting. There were some Cinerama close-ups of faces that created brobdingnagian nostrils that you could have driven a truck through. But in 3-D, a close-up means that the image comes closer to you. It stays the same size, but comes right up to you—face to face.

*Sea Dream* is such an accomplishment in 3-D technology that the Museum of Holography in New York City arranged for Saturday screenings as part of their exhibit during the months of March and April. The infant art and science of holography is no match for modern processes like Spacevision. The technology of stereoscopic photography dates well back into the last century while holography is only two decades old.

But what about that 3-D TV broadcast mentioned in the opening of this article? Well, 3-D TV does indeed exist today, though it is not nearly as accessible to the general public as 3-D movies. There *have* been public demonstrations though, and 3-D TV is used in closed circuit systems in nuclear power plants, hospitals and scientific research laboratories. From time to time, demonstrations of state-of-the art 3-D TV are held at technical conferences and conventions. As long ago as 1972, John Rupkalvis of Stereo-Scope presented a large screen (6 x 9 feet) demonstration of live closed-circuit, three-dimensional color TV for the Architectural School of the University of Minnesota. Near-



Special setups abound in *Sea Dream*. Here a special rig is constructed to allow butterflies to float before the 3-D cameras and, later, the viewer's faces.



An audience in the Marineland theater experiences the wonders of *Sea Dream*. The picture on the screen is simulated for this illustration.

ly a decade earlier in 1954 and 1955, James Butterfield (who currently holds a number of patents in 3-D TV) transmitted 3-D TV on a daily basis in Mexico.

One of the most remarkable applications of 3-D technology has been in the field of microsurgery. Dr. John P. Beale, Jr. of the San Francisco Eye Institute, a pioneer in the field of microsurgery, saw the need for a new medical instrument which would combine a surgical optical microscope with color 3-D television—a Surgical Stereo-Video Microscope. Dr. Beale went to James Butterfield with his request and such a system was developed.

In June of 1974 a patent was granted to Mr. Butterfield for his Stereo Television Microscope (#3,818,125). The system incorporates a miniature 3-D color television camera attached by means of a beam splitter to Dr. Beale's surgical microscope. During the

operation the surgeon is able to use either the optical microscope or view the 3-D television screen without any special glasses. The surgeon is no longer tied down to a single tiring position during the long hours of surgery. He is free to move his head, look at his assistants or other instruments without having to re-focus his eyes as would be the case with a conventional microscope.

Dr. Beale also employs the use of a large monitor in his operating room so that the operating team can view the progress of the operation. The signal can also be fed out to other color 3-D TV monitors so that visiting doctors and personnel can observe the same picture the surgeon sees and follow his progress during the operation.

The 3-D picture can also be videotaped for "instant-replay" in the operating room, should the surgeon so require, or to allow students

(continued on page 70)





PHOTO: JAMES L. LONG OF JAMES L. LONG ASSOCIATES

Chinese Vice Premier Deng Xiaoping kicks the tires on a lunar rover during a visit by the Chinese to Johnson Space Center.



# Space International

By MICHAEL CASSUTT

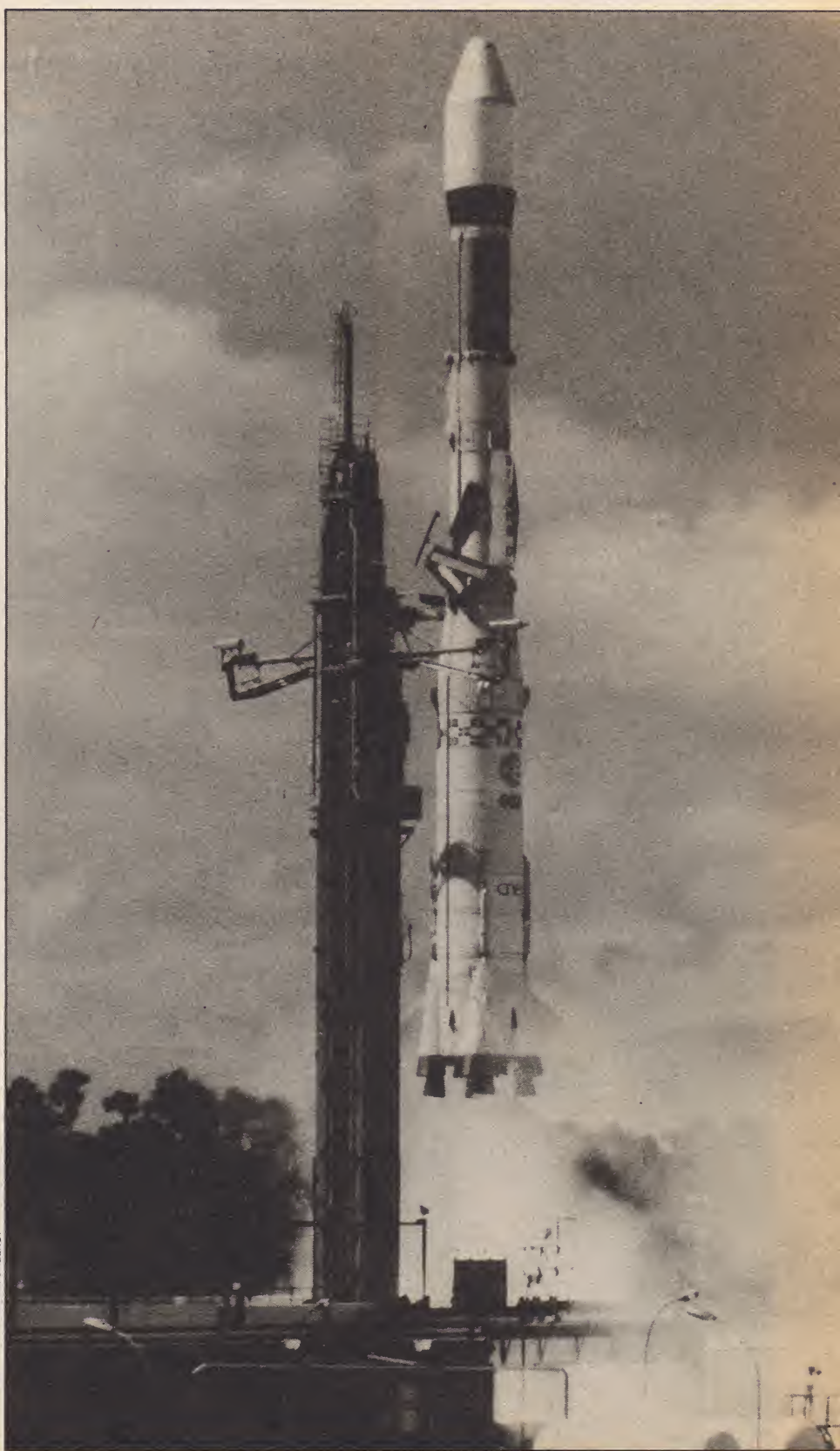
It may come as a surprise but the U.S. and the U.S.S.R. are not the only countries with plans for outer space: Enter China, France, Japan, West Germany, Poland. . .

**T**hat's one small step for a man . . . one giant leap for mankind." When Neil Armstrong spoke those words from the dusty Sea of Tranquility there were just two nations on Earth capable of exploring space. Only the United States and the Soviet Union, spurred by the tensions of the Cold War, could make the tremendous commitment of resources and money necessary for human beings to travel in space. Armstrong was expressing a noble sentiment, not fact.

But before the tenth anniversary of the American Moon landing had passed, citizens of nations like Czechoslovakia and Poland had orbited the Earth, and researchers in many countries were planning even more ambitious projects—some in partnership with one of the two space superpowers, others entirely on their own. Ironically, Armstrong's colleagues and successors have remained earthbound for half the intervening decade. Last spring a series of hearings before the U.S. House Subcommittee on Space Science and Applications drew participants from all over the world, including Prof. Hubert Curien of the Centre Nationale d'Etudes Spatial (France), Dr. Minoru Oda of the University of Japan, Dr. Wolfgang Fink of the Department of Space and Transportation (West Germany), and Roy Gibson, Director General of the new European Space Agency. They testified to an inescapable, perhaps inevitable situation, best summed up by Jerry Grey of the American Institute of Aeronautics and Astronautics (AIAA). From now on, Grey said, "The United States and the U.S.S.R. will no longer dominate space activities."

The international age of space exploration has opened. Here's a progress report:

The U.S. and U.S.S.R. have encouraged international participation in their national space programs since the early 1960s, when satellites of countries like Great Britain, Canada and France were fired into orbit aboard boosters launched by the superpowers. It quickly became obvious that the only practical way for smaller nations to get around the staggering costs of hardware development—and to take advantage of accumulated knowledge—was as members of larger groups focused on one superpower or



Liftoff of the French booster Ariane in its first successful test flight.



the other. Western European nations joined forces in ESRO (the European Space Research Organization) and ELDO (the European Launcher Development Organization) in 1963 and 1964. There were also numerous agreements between the U.S. and countries like Italy, Canada and West Germany. However, by 1962 the U.S.S.R. and its bloc of Eastern European allies had already formed "Interkosmos."

Interkosmos has nine members (East Germany, Poland, Bulgaria, Cuba, Mongolia, Rumania, Hungary, Czechoslovakia and the U.S.S.R.) who together fund and develop networks of Earth resources satellites, communications satellites, and—most recently—manned spacecraft. All such spacecraft, of course, are launched in the U.S.S.R. But there has been a steady increase in active participation in space missions by the Interkosmos nations, highlighted by an announcement by the Soviets in 1976 that the new "Five Year Plan" of exploration would see researchers and pilots from the member nations making trips into space. The ultimate goal of the plan is the establishment of a permanent station in space, manned by an international crew.

In December of 1976 the first international cosmonauts arrived in Moscow to begin training for flights aboard the U.S.S.R.'s Salyut space stations. All of the men were military pilots, called "cosmonaut-researchers" by the Soviets. On March 2, 1978, Captain Vladimir Remek, a 29-year-old captain in the Czech Air Force, became the first citizen of a nation other than the U.S. and U.S.S.R. to travel in space. He went into or-

bit aboard Soyuz-28, which docked with the orbiting Salyut-6 space station, and spent a total of six days in space. Remek's voyage was duplicated later by pilots from Poland, East Germany and Bulgaria. Eventually citizens of all the Interkosmos countries will fly in space—and the U.S.S.R. announced in July 1979 that it would soon accept pilots from France and India into its space program.

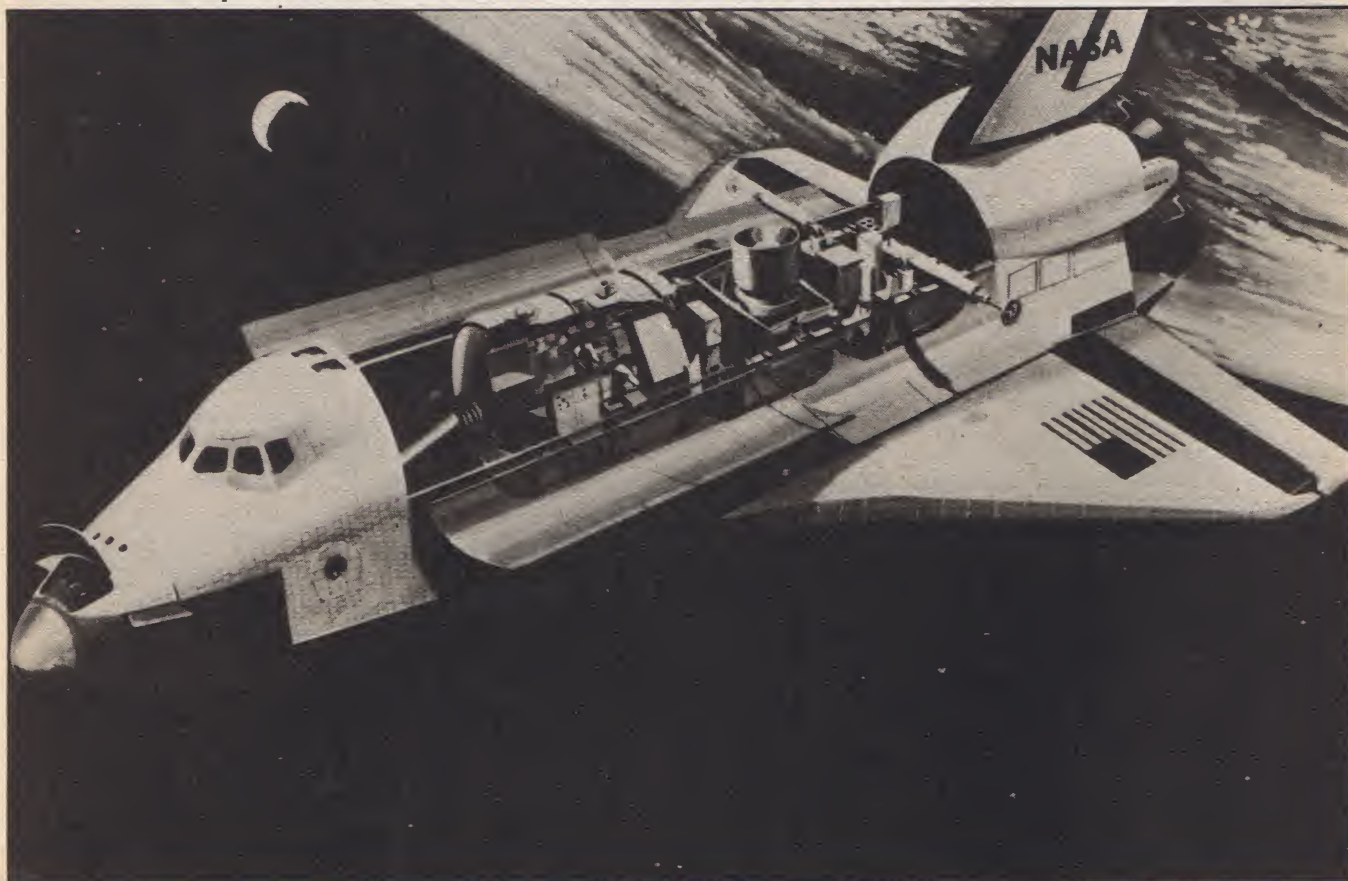
### European Space Agency

The drive to explore space has never been limited to a single nation or people. The first

true theorist of interplanetary flight was a Russian, Konstantin Tsiolkovsky; and European writers like Hermann Oberth of Germany and Frenchmen Robert Esnault-Pelterie and Andre Hirsch made great contributions toward popularizing the crazy idea of travel in space. (Esnault-Pelterie and Hirsch, for example, invented the term "astronautique.") The British Interplanetary Society evolved from a group of hobbyists and rocketry fans to a well-known and respected source of information about space travel. Great Britain, Italy and France had well-



Spacelab 1 payload specialists are international. From left, Claude Nicollier (Swiss), Ulf Merbold (German), Wubbo Ockels (Dutch), and Michael Lampton and Byron Lichtenberg (U.S.)



Spacelab, shown here in the space shuttle cargo bay, was developed by European Space Agency for use on shuttle flights in the 1980s.



developed space programs of their own by the late 1960s, but none of these nations was capable of launching interplanetary probes or manned space flights.

But today the new European Space Agency, which rose from the ashes of ELDO and ESRO in 1974, is preparing to deliver Spacelab to America's Kennedy Space Center for launch aboard the Space Shuttle *Columbia* in late 1981. Spacelab is a self-contained scientific module that will be manned by crews of Europeans and Americans for periods of up to 30 days in space.

Five finalists for the Spacelab-1 mission are already in training. Aside from two Americans—Michael Lampton, an astronomer from the University of California at Berkeley, and Byron Lichtenberg, a scientist from MIT—there are three European candidates: Ulf Merbold, a physicist from West Germany; Wubbo Ockels, a physicist from the Netherlands; and Claude Nicollier, a Swiss astronomer. One of these men will fly the Spacelab-1 mission and the others will perform backup and support roles.

It was recently reported that ESA is devel-

oping a small, four-man "space-shuttle" of its own. Called the "Hermes," the lifting body craft will be launched by the Ariane 5H booster and is meant to plug the gap between the limited capabilities of unmanned satellite launchers and the expensive American space shuttle—which is also at the mercy of the American Congress.

### Japan

The Japanese have a strong new space program of their own, and it owes little to the U.S. or U.S.S.R. Under the auspices of the National Space Development Council the Japanese plan to orbit maritime navigation vehicles and communications satellites. It is reported that they will also be among the first users of NASA's "Getaway Special" offer (where NASA will fly packages aboard the shuttle for a small fee). Some scientific packages will be under the care of Japanese payload specialists, and there has also been discussion of future Japanese participation in future Spacelab and space station programs.

### China

In the spring of 1979, following the normalization of relations between the U.S. and China, a team of American space experts led by NASA associate administrator Anthony J. Calio toured 19 Chinese space and space flight-related facilities in that country. Included were plants for the production of rocket engines and their testing, tracking stations and, most importantly, the main launch site at Shuangchengzi (in the middle of the Gobi Desert, about 1600 km west of Beijing). The Americans came away impressed. One said, "They clearly are where the U.S. was several years into our own space program." And the Chinese are said to be planning manned space flights, though that is not the primary aim of their program yet.

There is at least one more potential explorer of space—and this one isn't affiliated with anybody. West German entrepreneur Lutz Kayser's OTRAG (Orbital Transport and Rocket, A.G.) is a *private* company that is developing cheap throw-away boosters that can be sold to any taker. Kayser's OTRAG-1,000 booster had two successful launches in Zaire, but the businessman has since been ordered out of the country. Nevertheless, Kayser says he will eventually build the OTRAG-10,000 rocket, which will be capable of delivering 10,000 kilograms of payload into Earth orbit. By way of comparison, remember that America's manned Gemini spacecraft massed less than 3,000 kilograms. And the price of an OTRAG launch is projected at around four million dollars—a fraction of what it costs to launch a satellite with conventional American, Soviet, or European boosters.

The age of space enters its third decade, and it's clear that the space race has given way to space international. Tsiolkovsky said, "The Earth is the cradle of mankind, but one cannot stay in the cradle forever." All of mankind—not just the U.S. and U.S.S.R.—is taking the first small steps.

Giant leaps can't be far behind.



Bulgarian cosmonaut Georgy Ivanov, who flew on Soviet Soyuz 33 mission in 1979.



Polish cosmonaut Miroslaw Hermaszewski, veteran of Soyuz 30 flight.



## Stellar Strangeness: Black Hole Books

### Mystery

In the 1920s, British biologist and essayist J.B.S. Haldane wrote, "Now my suspicion is that the universe is not only queerer than we suppose, but queerer than we *can* suppose." Today's astronomers and astrophysicists seem intent on proving the good gentleman right with all their talk of the bizarre behaviors of pulsars, quasars and that

celebrated bit of stellar strangeness, the black hole.

Recently black holes have starred in a major motion picture and been featured in news-magazines. Now the wonderful world of book publishing has decided to take its turn at the topic.

One of the first to take a shot at explaining this incredible (and possibly nonexistent) phenomenon is the dean of American science writing, Walter Sullivan, science editor for the venerable *New York Times*. In **Black Holes: The Edge of Space, The End of Time** (\$17.95 in hardcover from Doubleday), Mr. Sullivan unfolds the enigma of these oddities like a prime detective story. He traces the origin of the idea, lays out the evidence found in the deeps of space with the quasars, pulsars and supernova remnants, introduces the characters involved and cites the suspects in true mystery fashion.

First you must understand, says he, that this isn't really such a new idea. All the way back in the 18th century, a French astronomer described invisible stars so massive that they wouldn't let light escape. In 1916, a German named Schwarzschild explained how you could poke a hole in space if you could concentrate a star's gravity into a single point. And then in 1939, Robert Oppenheimer, father of the atomic bomb, explained how the death of a massive star might produce just such a concentration and resultant hole. None of these gentlemen, though, believed that they were doing anything more than playing with numbers—they assumed the real universe could never do anything so strange.

But in the '50s, the big new telescopes, the brand new radio telescopes and a new generation of watchers began discovering that the universe was much less sensible than everyone had given it credit for. They found stars shining brighter than entire galaxies, radio

beacons shouting at us from billions of light-years away and a whole host of other equally improbable phenomena. Suddenly, the strange mathematical exercises of Oppenheimer and company were dragged out and dusted off and the phrase "black holes" entered the scientific vocabulary.

Black holes are black because their gravity is so great that not even light can escape them; they're called holes because while something can fall into one, it can never escape. The scientists' best guesses are that these are the corpses of massive stars, but a good many of these esteemed gentlemen would rather not think that matter could behave so capriciously.

Mr. Sullivan's calm dissection of the history of this idea makes for fascinating reading. He does his usual extraordinary job of making the incredible understandable, making clear the scientists' simultaneous excitement at an entirely new way of looking at the stars and their bewilderment as they realize the incredible possibilities of a hole in space that can eat stars, may have been the beginning of the universe and might determine the end of same and, strangest of all, might be a road to other dimensions, places or times.

Sullivan strikes a fine balance, giving the evidence for and against these stellar corpses and leaves you with a good picture of the latest in cosmology and an understanding that the astronomical community's jury is still undecided on black holes.

### Theory

If you like your mysteries explicated more in the *Dragnet* manner—"Just the facts, ma'am."—then William J. Kaufmann III's **Black Holes and Warped Spacetime** (\$3.95 in paperback from Bantam) may be more to your liking.

Kaufmann is a California physics professor who ran Griffith Observatory for a while and also served as a research associate on the Viking missions to Mars—clearly a man with his eyes on the stars. He's also a writer who communicates his curiosity and enthusiasm about his subject with deceptive ease. If his lectures at San Diego State are anything like his book, I'm ready to go back to school.

This is non-technical explanation of the very technical at its best. Each chapter sets up the next. Kaufmann starts you off with a clear, concise explanation of the birth of a star, and that leads you to the death and transfiguration of stars into their various

spectacularly odd configurations—white dwarfs, neutron stars or black holes. For the sake of this argument, Kaufmann is ready to stand wholeheartedly on the yea side of the black hole question.

Now that you understand (and yes, you do) how a star becomes a black hole, Kaufmann carries you off into the really strange stuff—wormholes that can carry you to other

dimensions, across the universe or away in time; stopping time by standing on the hole's event horizon; or figuring out for yourself if a particular trip through this warped space will be spacelike, timelike or just utterly unlikely. What a difference a book makes!

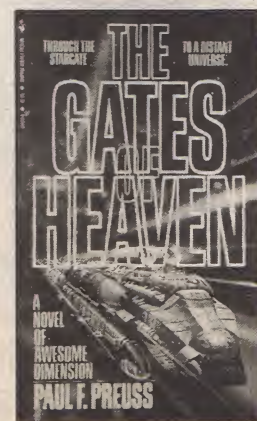
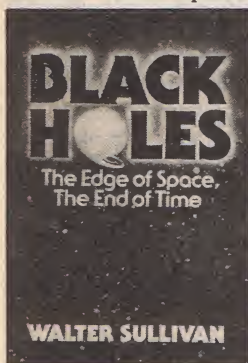
Kaufmann catches you up on history as you go along, hitting the high points of the last two decades' discoveries; but what he's most intent on is sharing this marvelous new notion with his readers. This book is a breakneck trip from the cosmic egg to the end of time, well-designed and well-written. If you want to know the facts, as best as the physicists can figure them, this fast and furious book is the place to find them.

### Extrapolation

If you want to see what an SF writer can do with one of these intergalactic anomalies, Paul Preuss proves himself to be one of the new talents to watch with his debut novel, **The Gates of Heaven** (\$1.95 in paperback from Bantam).

Preuss manages to include all of SF's hot topics—space colonies, asteroid mining, SETI/CETI, FTL travel, a heady dose of cloak-room politics, a real humdinger of a lady soldier and a black hole—all wrapped up in a terrific action story. If he missed

anything, I haven't heard of it.





The story goes like this: One day the folks at Operation Cyclops—the radio telescope array searching for extra-terrestrial signals—get a transmission from Tau Ceti, a star a dozen light-years away. The transmission turns out to be from a ship that fell into a black hole a dozen years ago. As one Cyclops team member observes, “We have met the aliens, and they is us.”

Preuss never slackens his pace from this amazing beginning to the very last page of his solid SF adventure. He manages a good argument for his use of a black hole as a highway to the stars, has figured out a neat way to lasso the asteroids and has put together a coherent picture of a near future that includes all these things.

The trip through the black hole to rescue the stranded crew of the *Actis*, late of rebellious Colony L-5, is the heart of this adventure, and Preuss handles that nearly as well as he does his ideas. But with a cast that includes a deadly ambitious lady soldier and a somewhat distracted young scientist, how could he miss?

This first novel is a hot one. It's full of surprises and most of them seem to work. In fact, this is a good way to test what you've learned from Mr. Sullivan and Mr. Kaufmann, or it's just a good way to have some fun. Me, I'm waiting to see what Preuss thinks up next.

### Context

Now if all this talk about stepping into a hole and coming out on the other side of anywhere leaves you feeling confused; if you think you'd like to start with something a mite more basic and work your way up to the cosmic

improbabilities of black holes and such, then Nigel Henbest has just the thing you need. He's prepared a spectacular introduction to science's new top ten. It ranges from cosmology to biology, geology to particle physics

and it's titled *The Exploding Universe* (\$19.95 in hardcover from Macmillan).

Two things make this coffee-table-sized compendium a standout—the first is Mr. Henbest's clear, simple prose and the second is the fact that this book is jammed full of beautiful, informative color art.

Mr. Henbest starts with basic principles and builds your understanding up until you can move on to the more complicated stuff. In short order, you find yourself understanding him as he walks you through a host of

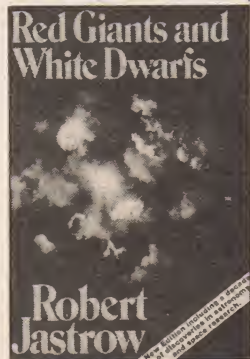
scientific arcana that includes quarks, plate tectonics, DNA and on and on.

Henbest manages to give you a sense of science's newest view of the world and the universe by moving back and forth between great and small. From a discussion of the physicists' newest playthings in the subatomic world, he moves on to the latest recipe for the beginning of the universe. He balances a description of the creation of the planets with an explanation of how DNA developed on this planet and the new games the geneticists are playing with those molecules.

This balanced, peripatetic presentation will keep you reading, excited and surprised, and the attractive art and packaging make it a bargain at the price. This book can't be recommended strongly enough.

### Roots

Another survey of science comes from pop-sci superstar Robert Jastrow. More than a decade ago, Jastrow wrote an international bestseller about the origin of our world and our place in the cosmos. Many of our ideas about the cosmos have changed in the years hence, and so now Mr. Jastrow presents us with a revised version of his bestselling *Red Giants and White Dwarfs: Man's Descent from the Stars* (\$12.50 in hardcover from W.W. Norton).



with up-to-date, understandable science.

Like Henbest, Jastrow starts with the smallest sub-atomic particles and builds up to the birth of the stars. Where he differs is in his concentration on the evolution of our solar system, the evidence that our exploration of this solar system has given us about it and where human evolution fits in with all of this.

Jastrow assembles a compelling rendition of the evolution of our solar system from the same cloud of gas that produced our sun. Then, since this is a book about life, he takes us to the planets in our system that might be alive—Jupiter, Mars and Venus—to speculate about the possibilities our robot explorers have found. This is a comprehensible, comprehensive exploration of life—reading that will let you trace your heritage all the way from the Big Bang to the appearance of humans on Earth. It promises to hold a surprise or two for everyone.

### Beyond

Fred Pohl's last book, *Gateway*, starred a computerized psychiatrist, a somewhat traumatized astronaut named Robinette Broadhead, a mysteriously vanished alien race called the Heechee and a black hole. It won every award in sight.

Now, Robinette Broadhead returns in *Beyond the Blue Event Horizon* (\$9.95 in hardcover from Del Rey Books), along with a cameo appearance by the black hole and (surprise!) a solution to the mystery of the Heechee. These last two items are only frosting on a terrific new SF thriller.


This story features a new Heechee artifact—a giant factory ship that makes food out of the stuff you find between the stars. It's been left on automatic out beyond Pluto, and Pohl's overpopulated and starving future Earth desperately needs it. Broadhead, wealthy from his black hole trek in *Gateway*, finances an expedition to the factory, dispatching a Teutonic septuagenarian, one Gateway-trained daughter and her husband, and one fourteen-year-old female in the throes of adolescence. When this quartet arrives at the factory ship, they find that not only is it still working, it also contains a space-traveling Tarzan—Wan, a boy raised among a new kind of alien.



Wan offers them a deal they can't refuse—a Heechee ship that's even farther out...and may contain the key to the whereabouts of the Heechee. And from this point on, Pohl really turns on the

fireworks. The pace is breakneck, the climax classic and the whole trip one you do not want to miss.

All right, here are six books featuring black holes—just the tip of a trend all about something we couldn't even see if we found one. This fascination may be normal for scientific sorts, but why are all the rest of us so interested? Is it because black holes are such absolutely perverse phenomena—or is it just because they are so absolute? Theorists say “black holes have no hair,” meaning that even if one is discovered we'll never find out anything from it. Whatever goes in is gone. Stephen Hawking, a leading theorist, says, “God not only plays dice (with the universe), but sometimes he throws them where they can't be seen.”

Maybe we all think that if we can figure out how to get a peek into something this strange, we can figure out anything. Then again, maybe we're just hooked on strange. 



## Books in Brief

**Shadow of Earth** by Phyllis Eisenstein (\$2.25 in paperback by Dell). Time machines and alternate universes are certainly the stuff from which science fiction is made, but apparently these ingredients alone do not an SF novel make. Celia is a normal, red-blooded American girl whose lover invents a belt which will transport the wearer to an alternative universe. In this other reality, the Spanish Armada defeated the English in 1588; thus, according to the author, "Holy Mother Church, stifler of innovation, persecutor of Copernicus, Bruno, and Galileo, bred a world of limited horizons and scant technological progress."

Celia is quickly transmitted to this rather primitive Spanish America, where Latin macho men swagger about swilling ale and whoring in wayside inns. She is immediately captured, sold to a brave, dark, handsome, conquistador-type and... well, you can guess the rest. This is strictly 20th century Gothic; although of its type it's good: the heroine is fairly spunky (while definitely not the stuff of which science fiction heroines are made) and the story comes to a satisfactory conclusion. But as a science fiction novel (and it is being marketed as one), it leaves much to be desired. (Barbara Krasnoff)

**The Ennead** by Jan Mark (\$2.25 in paperback from Pocket Books). On the desert world of Erato, the residents have effectively solved the unemployment problem: anyone without a job is deported. Their destination is the troubled neighboring planet Euterpe, where the survival rate after the harrowing two-year journey back is almost zero. Essentially, it is a death sentence.

This threat is the major motivating factor for the three protagonists of this well-written novel. Isaac, the last survivor of a pollution-devastated planet, lives in constant terror of deportation, and his life is dedicated to the manipulation of people in order to ensure his

continued employment. Part of his scheming is Eleanor, a young sculptor from Euterpe whom he means to pair with his powerful half-brother (thus putting them both in his debt). Unfortunately, rather than being the frightened, grateful immigrant he expected, Eleanor is a strong-willed woman with plans of her own. The third part of this emotional triangle is Moshe, a quiet gardener who turns out to have a secret history.

Author Mark has created both a believable universe and a strong cast of characters; and while she makes a few points along the way, they never interfere with the story line. However, it is the changing relationships between Isaac, Eleanor and Moshe, and their interaction with their society, that makes this an interesting and worthwhile novel.

(Barbara Krasnoff)

**Binary Star # 4** by Joan D. Vinge and Steven G. Spruill (\$1.95 in paperback from Dell). In this, the fourth of the Binary Star series (in which two novellas are published in one volume), we are introduced to two couples with problems.

In *Legacy*, by Joan Vinge, the duo is made up of mediaman Chaim Dartagnan (Dartagnan?), a future fusion of public relations agent and news reporter, and space pilot Mythili Fukinuki, who in a low population society has committed the crime of becoming sterile. The two are reluctantly partnered on two adventures involving the rescue of a space miner and a search for valuable artifacts on former asteroid colonies decimated by war. The story is exciting, but the relationship between the two protagonists follows a rather familiar pattern: boy meets girl, boy loses girl (in this case, on an Antarctica-like planet), boy meets girl again, boy and girl "find" themselves, and they live happily ever after.

The relationship between Steven Spruill's characters in *The Janus Equation* is less predictable. The storyline concerns the kidnapping and escape of genius mathematician Paul Essian by one of the four huge corporations who run a united world. He is about to uncover the secret of time travel—and they want it. Underlying all this cloak-and-dagger action are Paul's emotional conflict about his sexual identity and his relationship with Jill Selby, a woman to whom he has an unexplainable and overpowering attraction.

While both these novellas make for good, solid science fiction, around the end of each first chapter you know that the main characters, who are pretty messed up at the beginning, are going to become happy, stable human beings at the end—which tends to make each of their quests a little less interesting. (Barbara Krasnoff)

## Empire

(continued from page 26)

inception. Adding to the hectic activity on the movie were several unexpected problems. Writer Leigh Brackett died shortly before completing the final draft of the script. During the early days of production, an avalanche in Norway stranded 80 cast and crew members for two days before rescue parties could dig them out. Yet, the filmmakers persevered and, in the finished film, several of artist McQuarrie's more incredible designs will be unveiled in all their widescreen glory.

"I worked the hardest on the cloud city of Bespin," says the illustrator. "I designed the city itself and the entire environment. In a way, it's a holdover from the first film. It's grown quite a bit since its original design. It's now quite a huge place. It's an ancient city, an incredible sight. It floats through the sky because of this huge anti-gravity design. Various peoples have occupied it through its thousands of years of existence. It was originally a mining community, although we don't stress this fact in the script." McQuarrie reflects for a moment. "I don't really know what a city in the clouds could mine anyway. Maybe gas. It's just a very picturesque and beautiful location.

"I also designed some pretty bizarre characters for the cloud city. There's this one fellow that everyone came to call 'pig man.' He's a pretty strange monster-like creature."

From the sky above, McQuarrie turned his attention to the land below, contributing quite a few design elements to the frigid fortress occupied by the rebels on the ice planet Hoth. "I worked on a lot of the equipment used on Hoth, both by the rebels and the Empire. I did very little vehicle work on the first film, although the Sand Crawler was pretty much based on my sketches. This time, I designed the armored speeders that the rebels use to combat the Empire's forces. They're low-level fighters. They're comparable to the vehicles called 'tank busters' during World War II. I also designed the probot, a large, spider-like craft that patrols the surface of the planet.

"I did some work on the bog planet that I'm very proud of," he states. "I enjoyed the sketches more than the finished paintings. The bog planet is a jungle-like forest world. I conceived it as a sort of petrified tree world. Those trees have endured the elements for thousands of years and are now dead and gnarled. They tower over the swamp below."

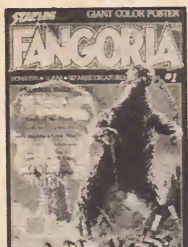
Together with peers Norman Reynolds and Joseph Johnson, McQuarrie has once again helped Lucas and Kurtz envision the unimaginable... a return trip to a time long ago and a galaxy far away. And, in a very unegotistical way, McQuarrie is very proud of the finished results. "Sometimes the finished product differs a great deal from my paintings," he shrugs. "Sometimes not at all. Regardless, the finished movie will be the result of teamwork involving some of the most creative people in the movie industry today. I'm happy to be a part of it."





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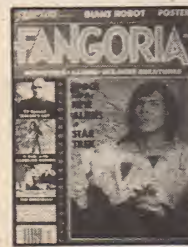
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#2—Don Coscarelli on Phantom; Humanoid, Dracula and Nosferatu previews; Richard Matheson interview Pt. 1; Making Pal's War of the Worlds; Robert Florey's lost Lugosi Frankenstein; Rouben Mamoulian on Jeckyll and Hyde; Prophecy FX; Carl Lundgren FantasticArt; Dr. Who villains and Who poster.



#3—David Cronenberg on The Brood; Stephen King on Kubrick and The Shining; Matheson Pt. 2; Kolchak the Night Stalker article and episode guide; Jack (It Came from Outer Space, The Creature) Arnold remembers; Arabian Adventure, Tales of the Unexpected previews; Mike Sullivan FantasticArt; ALIEN poster art by Barclay Shaw.



#4—Aliens of Star Trek—The Motion Picture; Robots of The Black Hole; Film femme Caroline Munro; Herschell Lewis "The Wizard of Gore"; Invasion of the Body Snatchers, King Kong and Curse of the Demon behind the scenes; On the set of "Salem's Lot"; Michael Hague FantasticArt; Warrior Robots from Astro Boy to Voltus V plus Robot poster.



#5—Carpenter and Hill on The Fog; Saturn 3's SF horror; Bert Gordon's The Coming; Jason of Star Command's monsters; Galactica's Cylon Secrets; Behind the Scenes of THEM!; Son of Kong and Village of the Damned; Dennis Anderson FantasticArt; Pull-Out Bonus—21" x 32" Fairies Posterbook.

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## PORTFOLIO

# Morris Scott Dollens

By JEFFREY ELLIOT

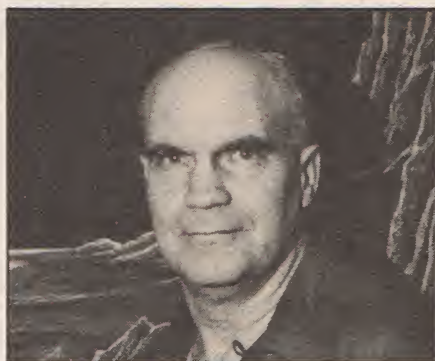


PHOTO: LLOYD NESBITT

**A**lthough he was born in Indiana in 1920, Morris Scott Dollens spent his youth in the metropolitan area surrounding the Twin Cities of Minnesota. The impressionistic astro-artist concedes, "Perhaps the coldness of the confined city life encouraged my interest in science fiction, wherein the reader can escape to distant times and planets.

"My art explains visually what space scenery possibly looks like," he explains, "based upon my own knowledge of geology, astronomy, climates, art forms, lighting and color. Since we will likely never see most of the scenes I depict, my work remains an embodiment, in fantasy form, of the dream of traveling to far places. Although it is possible someday in the future that some of our descendants may visit other star systems, at present our scientists cannot conceive of ways of practical travel, despite the imaginative flights of science fiction authors and illustrators. In some ways, science fiction artists are more like educators than conventional artists; the nature of our subject makes it so."

Dollens was introduced to the world of imaginative fiction through such favorites as *The Wizard of Oz*, *Fantasia*, *Tarzan* and, of course, *Buck Rogers* and *Flash Gordon* in the Sunday funnies. As a youth, he was an avid reader and collector of several early science fiction magazines, including *Amazing*, *Astounding* and *Wonder Stories*. At 16, the desire to draw and publish became the im-

petus for an art career. Dollens published 13 issues of an amateur magazine, hectographed on a pan of jelly, called the *Science Fiction Collector*. This experience led to the managing editorship of his school newspaper. A growing interest in the graphic arts culminated with positions as stage artist for the school's drama department and as photographer-artist-editor for his school annual.

Following a year at art school studying design and photography ("Other than that one year at the Minneapolis School of Art, run by the Minneapolis Society of Fine Arts, I am entirely self-taught."), Dollens went to work for a commercial photography studio in St. Paul. After two years there, he decided to move to California in 1942 to escape the harsh Minnesota winters. When he arrived, he went to work in the sound department of Metro-Goldwyn-Mayer studios, and stayed until he opened his own commercial and portrait studio, two years later.

In 1950, a Dollens photo-montage took first place in a *Camera* magazine contest; another similar entry won an award in a *Popular Photography* competition the same year. Subsequently, his series of symbolic paintings and photo-montages were exhibited for a month at the Coronet Theater in Los Angeles. With his early success, Dollens published a limited edition of these works in two books: *Fantasy in Art* and *Approach to Infinity*, printed on the artist's own press.

Dollens doesn't consider himself an il-

Morris Scott Dollens' "Rama," after the Arthur Clark novel of the same name, portrays a huge alien spacecraft of vast dimensions which comes alive after being visited by a group of Earth explorers.







Clockwise from right: Natural disasters strike a troubled world in a far-off alien star system; a colonial city and its "greenhouse" are protected by environmental bubbles from the harsh conditions of its adopted world (note the tiny outhouse sitting rather inconveniently to the far right); a spacy cityscape floats serenely past Saturn; three explorers climb a mountain in order to enjoy an alien landscape; and a strange black star streaks across the sky, shrouding the universe in night. Morris Scott Dollens' colorful and imaginative views of other star systems gives a new look at outer space. "My paintings are all based on my own ideas of what we might find there," says Dollens, "logically and artistically selected from my dreams and yearnings."



illustrator; he prefers to paint scenes that are inspired by his imagination, which he terms "impressions of the universe." However, this adherence to his own view of space art does have its drawbacks.

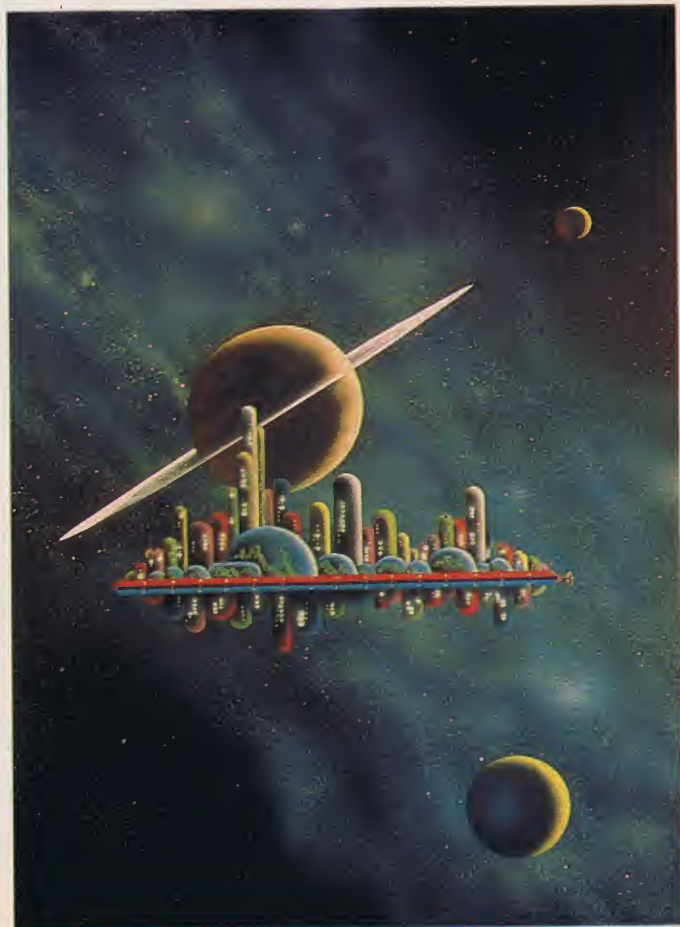
"The dominant problem would have to be the extreme insecurity of the position," Dollens says. "There are a few artists who have more work than they can do, and who can sell their pieces at very good prices. This is due in part to their great ability and talent, but even more so because these artists can

dramatize the story ideas so vividly, usually for the purpose of cover art that tempts the buyer to purchase a book or magazine. This type of science fiction art is in great demand.

"Moreover, these artists live in the New York publishing area and can confer about their work. I do not want to have to go to New York, and although I greatly enjoy the works of others in the field, I do not take extremely detailed orders for my work. If I have orders in too great detail, I must often look up reference works, ask for comments from the

buyer and make changes; the project time can easily double or quadruple, often causing me to lose interest part way through the more prolonged works. I have read statements by other artists, especially illustrators, that they enjoy solving the problems devised by art directors or the requirements of a particular story; I have not felt that type of emotion at all. In most cases where I have had too specific directions, I can kid myself into being interested for a while, but eventually I return to the painting of subjects I love myself. As a









ART. © 1980 MORRIS SCOTT DOLLENS

This Oz-like scene must have looked strangely familiar to the explorers who have apparently just landed and are unloading.



result, I am not able to command the higher prices from the average person who cannot spend as much as a publisher who has commissioned work to order.

"A related problem is that I have not had much of my work published, thus its fame and relative value to collectors is less than some other artists."

Surprisingly, Dollens, who has some 1,800 astronomical paintings to his credit, is almost unknown in the popular market, outside of those who frequent science fiction conventions. He explains this apparent discrepancy as due, to a great extent, to the style of his artwork.

"Well, only a small part of the general public are interested in my type of art," Dollens asserts. "Most seem to enjoy the action of superheroes in comic books and the ersatz television science fiction like *Battlestar Galactica*. This type of art is full of action and beautiful effects, but woefully lacking in accuracy at times, even allowing for vast imagination, and is without depth of character or concept. At science fiction conventions, the pure astronomical art like I create accounts for perhaps only five or ten percent of the total displays, and even less of total sales.

"Action paintings, involving figures and elaborate spaceships, require a much longer time to complete," he continues, "often double or triple the straight landscape works; usually people who want these types of pieces must save up a long time to buy them. Most of my works are available for less than a hundred dollars, allowing quicker purchasing decisions in most cases. I tend to keep my landscapes relatively simple for one basic reason: They may be finished in a reasonable amount of time and thus sold at a more modest price. A publisher is not willing to pay hundreds of dollars for first reproduction rights to my paintings; I must make a modest living from the direct painting sale, with possible further income later from subsequent reproduction and sale of slides.

"The main reason that I do not do many figures, depicting story action, is that I am not basically an illustrator. My aim is to build up a clientele that will follow my work by mail, and at a few conventions, so that I can move from Los Angeles to a semi-rural place."

Perhaps because of his longing for travel, Dollens has created his own worlds by painting series of artwork that indicate the passing of time on an imaginary planet. "My paintings are designed in part to be viewed in series," he says, "and will eventually be offered as insert shots for film and television. Seeing a group of slides of a similar subject in sequence imparts a travelogue effect to them, almost like exploring the real place. I hope to soon offer slide series of my paintings of alien worlds; the sequence will follow dawn-to-dusk in one location, as if a person experienced the day there. This symbolic art expresses a message in my own mind, often obvious, but in many cases vague enough so that the viewers with different backgrounds may interpret it much differently, and thus enjoy it more with their own basic feelings. I would prefer that they interpret it in my way," he

adds philosophically, "but such is life."

For each painting, he follows a strict standard procedure which enables him, among other things, to keep his series slides faithful to the "reality" they portray. "I make three by four sketches of my ideas in a sketch book," Dollens explains. "For a group of paintings, several formerly done sketches are selected and re-drawn on white gesso-painted pressed wood panels  $\frac{1}{8}$  inch thick, usually 16 by 20 inches in size. This is a standard size and is easy for me to work on. Only the horizon and foreground mountains are indicated in detail; craters are molded on the ground area. With a number six round brush, I roll on Hyplar modeling paste in a similar manner to using a palette knife. The paste is actually marble dust in an acrylic emulsion.



ART. © 1980 MORRIS SCOTT DOLLENS

"Using a rolling motion to give slightly rough texture to the ground areas, I form  $\frac{1}{8}$  inch high ridges of mountain striations, and more shallow distant mountains and crater forms. When partly dry, a wet, wrung-out torn scrap of sponge is used to add further detail to the textures. After drying overnight, the sharp points are sanded down, and sometimes carved with a knife for more detail. This texture formation provides a working surface for the final detailing and results in the three-dimensional effect in the finished painting.

"At this point, the basic sky color and shading is sprayed on with a large airbrush. Tones are blended; planets, stars and clouds are added, either with a smaller airbrush or sometimes through a specially cut stencil, when sharp edges are required. Otherwise, the blending is done freehand, as in wispy clouds.

"Sometimes details are done with a brush, either filled with paint, or textured with almost dry-brush effect. Then the brush work is started on the distant horizon, mountains, and far craters; shadows and tones are painted. Often the ground is painted a bit deeper than the final effect desired, so as to be able to dry-brush some highlights over the textures in the distance. Working gradually into the foreground and the mountains, the deeper colors of the shadows are painted and,

when dry, the dry-brush technique is used on the highlights, giving a textural effect more realistic than is possible on a completely flat surface.

"Sometimes the airbrush is used sparingly to shade delicately the deeper shadows on the mountains. Often I put the painting aside for a day or two, if time is available, and get back to it later, and study it to see if I can add more details to make it more satisfying. The completed work is photographed on several types of film, and then six to eight coats of glossy plastic spray are applied to fill in the pores of the airbrushing. When the painting looks fully glossy, it is signed and sometimes titled, and then sprayed with two or three coats of matte spray."

With his long history of space painting, Morris Scott Dollens still has a great many plans for the future. "One of my great ambitions is the publication of my works in book form. For limited run editions, I would use my own private press equipment, other times relying on more professional publications to do the work.

"In the near future, I hope to finally start my magazine project, *Arts and Infinity*, to display my work. The magazine would also be a forum to pass on some of the information I have learned in my countless hours of photographing art, scenics, clouds and photo-montages; I would also like to show the uses of art and photography in expressing man's relation to the universe and his restless desire to see and explore the far reaches of this world and others.

"I have plans for perhaps 25 books, beginning with my own autobiography, *Dogstar*. The rest would be various instructional and inspirational books about my type of art and the means of reproducing art through various printing processes. Finally, I would like to do several science fiction novels which I could illustrate myself. I have seriously considered that I might become a famous science fiction author far quicker than achieving even moderate success in the art field; the opportunities in this area are considerably greater."

Meanwhile, Dollens will continue to turn out his space paintings, selling them for reasonable rates to private collectors. (Anyone interested in more information should write to Morris Scott Dollens, PO Box 692, Gateway Station, Culver City, CA 90230.)

And he will continue to hold to his unique philosophy of art. "My search for beauty is reflected in my artwork; this quest has become a source of philosophical identity which inspires and directs my work. Being able to interpret the beauty of the universe gives meaning to my life. Unlike the majority of science fiction artists, I do no paintings of social events of the future as depicted in 1984, or future cities and vast machinery so popular in this field. They are of value, both in stories and art, of course, but prolonged work on these subjects does not interest me. Even if I were paid well to do them, I would lose interest too fast.

"I get spells when it is a joy to conceive the subjects and carry them through; but, of course, if I could not sell them for a living, I likely would not do any art work at all." ▮



# STARLOG TRADING POST

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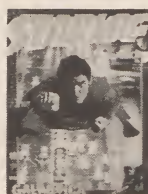
**Issue #3** (December) Special-effects issue, combination color landscape and *SPACE: 1999* Eagle blueprint poster, SF GRAPHICS catalog.  
**Issue #4** (February) Supermarionation issue, (2) color gate-fold posters of future cities, X-Wing Fighter blueprints, Godzilla.  
**Issue #5** (March) *Superman* special, In-Flight poster, International comic art, SPACESHIPS preview.  
**Issue #6** (April) *Wonder Woman* in Giant Poster, Japanese Monster Guide, SF art, Japanese history of robots.  
**Issue #7** (May) Science-Fiction Review. Much original Japanese SF art, photos—never before published in U.S. Forry Ackerman souvenirs, color photo collages and posters.  
**Issue #8** (June) *Superman* Section—the complete movie story. SF puzzles & mazes, Chris Foss fold-out, *Star Trek* animation.  
**Issue #9** (July) *Alien* preview and poster, Gum Card Collectors Section, *SPACE ART*, Roger Dean fantasy art, Behind-scenes of Japanese movie productions.  
**Issue #10** (August) Fantasy special, comic book art poster, space fashion, fantastic color art section.  
**Issue #11** (September) Blueprint poster cut-out—create an original destroyer ship designed by Japanese STARLOG. Comic art section, film previews, pinball and roller coaster spread, *Star Trek* photos.



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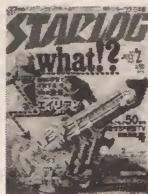
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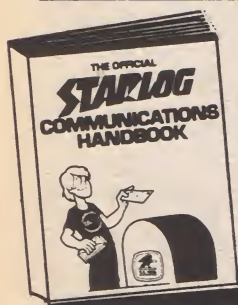


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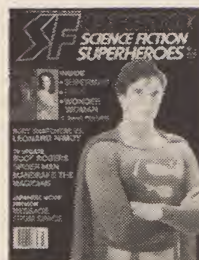
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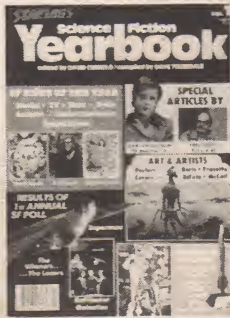
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# STARLOG TRADING POST

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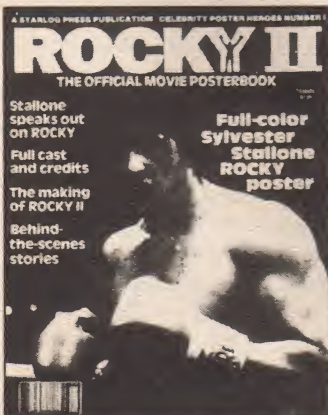


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## Exciting Science

(continued from page 17)

important ideas in science. And of course in technology it's utterly crucial."

"The most interesting piece of thinking in terms of problem solving, I think, is Context," muses Crimmins. "Most of us look at a puzzle, a problem and we wrestle with it and sometimes can't solve it because we just can't perceive it in a different context. If we switch our context, whether it's an art problem or a writing problem or a science problem, we often come up with new and surprising answers. I think *that* perception alone will turn people on."

"In school and university tryouts of the film, as we finished it up some viewers said, 'Hey, you guys are really talking about creativity!' It applies to the guys in science, but it's also for anybody who comes up against a dilemma. It's the kind of tool you reach for to solve any dilemma."

However, some *Search* viewers were not quite so enthusiastic. When the film opened in New York's Cinema II last December for a limited run, critical reaction was mixed. While the reviewers applauded the intent of the film, several objected to the brief way it touched upon so many topics, without going very deeply into any of them. According to Brad Darrach, those critics missed the point of the movie.

"We did not want to overload information," he says. "All we wanted to get across were these *key* ideas that somebody, anybody, any age could come away saying, 'Oh, *that's* what science is about!' We wanted to whet the appetite. We didn't want to satiate people. We wanted to leave them eager for more."

"Most people," agrees Crimmins, "see a couple of these films, the backs of their heads start working in new ways. And they think, 'Wow, that's interesting. I want it.' And a lot of people come back and see it a second time; a lot of the preview audiences we showed it to said, 'Gee, I'd like to see a couple of those things again.' That kind of hunger and curiosity is what we tried to inspire."

Another objection to *Search* involves its extremely optimistic view of science while avoiding any of the current controversies. Crimmins explains, "All the heavy issues of science—chemical toxicity, nuclear energy, overbuilt technologies—have been well covered in the evening news for the last 10 to 15 years. Doing that again didn't seem very efficacious. The problem is to get people to perceive how science thinks. Not to say it's led us astray—and it *has* led us astray. But to get at the process of science via the arts and athletes and all sorts of things that one wouldn't normally consider part of it."

"Why confuse the whole situation?" adds Darrach. "Nuclear energy is an issue which is controversial, and legitimately controversial, but has absolutely nothing to do with a fundamental understanding of science. I think it is appropriate to discuss the whole problem, and it should be discussed intently, but I don't think this is the place to do it."



Sixteenth century astronomer Tycho Brahe lost his nose in a duel over a math theorem.

PHOTO: © 1989 PLAYBACK ASSOCIATES

While *The Search For Solutions* was first slated as a feature film, that is certainly not its only function. In fact, says Crimmins, the structure of the film was planned so that it could be marketed in a variety of forms: as a three-hour film, as three one-hour shorts, or as a series of 20-minute segments. "This allows it to take on many different kinds of lives," he explains. "We designed this thing to break down. It's going on public television hopefully in May as three one-hour programs. Then it's going into theaters all over the country as shorts ahead of the features."

"We've tested it in six states and its adoption by schools and colleges is enormous. It's being translated into nine languages. It's going into foreign networks and schools in England, Norway, Belgium, France, Germany, Japan and mainland China."

"In addition," Darrach says, "we're sending out an enormous set of teaching materials; 92 pages of tabloid size. And Horace Judson [author of *The Eighth Day of Creation*] is writing a book to accompany the films; science criticism whereas the films are science appreciation. It takes up the same subjects that the films take up, but he goes about it in his own way, and doesn't always agree with us."

Both men agree that the project which began with *The Search For Solutions* has not yet ended. Enthusiastic about their new method of presenting science, Crimmins is thinking of producing a similar film about mathematics, among other things. And, of course, there is all that extra footage that was not used in *Search*. "As a result of our shooting," says Darrach, "we have the largest science film library in the world. That's now a resource which we hold in reserve, which we can use, which we could even sell if we wanted. Our intent is to go on and make more science films. We've really learned something about doing them. We don't want the possibilities we've developed to go to waste."

Asked whether there was any one message he wished his audiences to get from *The Search For Solutions*, Crimmins smiles. "Tell them it's enjoyable," he urges. "One of the things that we finally got people to believe in is that, hey, real science can be an enjoyable experience, not a foreboding challenge to one's ability to memorize." [E]



# Nuke Cinema

(continued from page 35)

wherein a deranged U.S. destroyer commander (Richard Widmark) passes the hours taking great pleasure in harassing a trespassing Russian atomic submarine in the North Atlantic. Eventually, tragedy mars his out-of-whack run and his anti-sub missiles are accidentally fired at the Russian sub.

Nuke power proved a plus in 1965's *Crack In The World* (Paramount). After scientist Dana Andrews tries to tap the molten energy at the Earth's core, he causes a crack in the globe's crust which spreads at a rather alarming rate. A nuclear explosion is set off in the crack's path which stops it cold. Unfortunately, it causes a chunk of the Earth to fly off into space, giving the planet a nifty new moon.

*The Planet of the Apes* films (20th-Century Fox, 1968-1974) relegated the post-nuclear fate of the world to second-rate status, concentrating instead on humanity's inherent jealousies and weaknesses and the corruptible nature of a society of any species. In the future, apes take the place of humans in the world and men and women are relegated to slave status. The two separate factions do battle, both physically and intellectually, for this five film series.

*Glen and Randa* (UMC, 1971) espoused a fairly bleak outlook concerning humanity's post-holocaust fate. Nearly three decades after Armageddon, two young lovers, Glen and Randa (Steve Curry and Shelly Plimpton) set out on an odyssey to discover the legendary "city" and, ergo, civilization lost. Finding an old *Wonder Woman* comic, they learn that this mythical city's name is Metropolis. An old man (Woodrow Chambliss) appears and unveils a parade of useless artifacts of pre-war Earth. Glen becomes obsessed with becoming "civilized" and takes up such habits as sitting before a dormant TV set with a pipe clenched between his teeth.

Randa dies in childbirth and Glen and the old man continue in their quest. Not exactly a happy ending but, then again, director James McBride was not interested in emotional highs. "Glen becomes a civilized man," he explained at the time of the film's release. "In doing so he gradually alienates himself from everything that has meaning to him on a human level... and, in a way, that destroys Randa. Glen gets farther away from living in a kind of harmony with nature and becomes a soldier in battle against the process of nature." A soldier cut from the same cloth as the ones who caused the final war in the first place.

*Chosen Survivors* (Columbia, 1974) gathered a group of scientists and bigwigs in a desolate underground survival center after the final war. Faced with a boring, isolated lifestyle, their problems become increased somewhat with the arrival of a squadron of hungry vampire bats, dropping in from a nearby cave. Adding insult to injury, the whole nuclear war was a fake. Just another government psychological warfare experiment.

Harlan Ellison's "A Boy and His Dog" was adapted for the screen in 1975 by actor/filmmaker L.Q. Jones for LQJaf Presentations. In the year 2024, in the aftermath of a devastating nuclear war, Vic (Don Johnson) and his telepathic dog Blood (the voice of Tim McIntire) roam the ravaged plains of America, attempting to both stay alive and elude the grasp of the slightly deranged roverpacks. Meeting up with anachronistically demure Quilla June (Susanne Benton), Vic stumbles into a romantic triangle wherein one third of the affair is of the canine persuasion. Through Quilla June, Vic is lured into the twisted civilization of underground Topeka wherein the last human caricatures of 20th century middle class society cling tenaciously to their old habits. The government down below intends to use Vic as a "father" for scores of underground denizens to come. Eventually, Vic makes his escape topside. Reunited with Blood, he saves man's best friend's life at the cost of a human mate.

1976's comic book-ish *Logan's Run* (MGM) gave moviegoers a post-nuclear game of cowboys and Indians swathed in 1960s counter-culture politics.

1977's *Damnation Alley* (20th Century-Fox) was an ill-conceived throwback to the post-nuke heroics of the early 1950s SF movies. Holocaust survivors Jan-Michael Vincent, George Peppard and Dominique Sanda make a cross country journey to salvation/civilization in Albany, New York. Why Albany? "Because it's there," says Peppard. En route, they encounter nasty barbarians and mutant cockroaches as large as regulation-size mutant cockroaches should be.


*The Chosen* (AIP, 1978) originally started out as *Holocaust 2000* but was deviled to cash in on the supernatural bandwagon. Either way, it set a new low in terms of nuclear paranoia with the anti-Christ seeking to set off a nuclear power plant scheduled to be built in an unnamed Mid-Eastern country. Kirk Douglas is understandably upset by the news, since the reactor is his brainchild and

the anti-Christ is his child. In a brilliant scientific gaff, the filmmakers postulate that if the fusion reactor in question explodes, it will set off the reactors in neighboring countries, thus beginning an explosive demonstration of the domino principle that will do in the entire globe.

1979's *The China Syndrome* advanced the cause of nuclear film, bringing it into contemporary headlines with a screenplay that was based, in part, on fact. Forsaking the idea of nuclear war, *The China Syndrome* focused on a nuclear catastrophe of a slightly less ostentatious nature: that of an accident at a nuclear power plant—an accident that slowly, but surely, could contaminate and destroy the land and the life around it for centuries to come.

The accident in the film was based on a series of actual events occurring at power plants in the midwest and on the east coast. While the nuclear industry initially condemned *The China Syndrome* for its sensational approach to the "virtually impossible" series of events culminating in the accident, a real-life debacle at the Three Mile Island reactor complex barely a month after the film's release squelched further criticism.

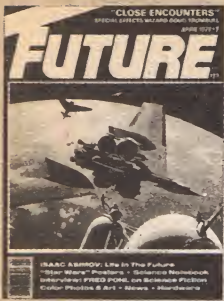
With both the atomic energy question and the threat of nuclear war currently in the news, it seems likely that the film industry will increase its incidence of nuclear philosophizing. Although in general it can certainly be stated that motion picturedom's approach to the subject is anything but cerebral, it can be effective and certainly attention-getting. Who knows? If Cold War II becomes a reality and Hollywood gears up for a second spate of calamitous crystal gazing, maybe this time around their message will get through not only to the masses but to the legion of lawmakers, too. The potential Dr. Strangeloves. The instigators of possible *Fail Safe* set-ups.

The message is, after all, a simple one. Beneath the celluloid layers of mutants, monsters, barren land masses and madness is the elementary truism: war is not healthy for children and other living things. 



Beneath *The Planet of the Apes* featured Radio City Music Hall minus the Rockettes.





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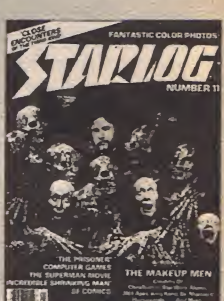
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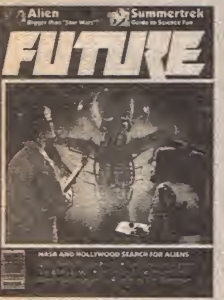
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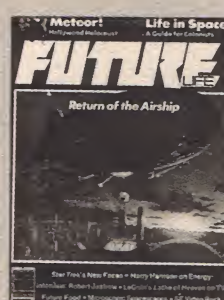
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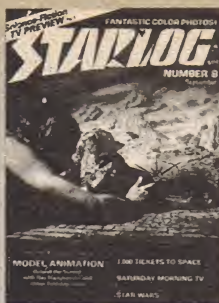
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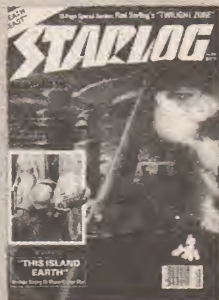
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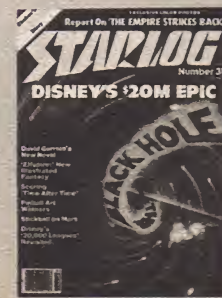
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# Quo Vadis 3-D

(continued from page 49)

the opportunity of witnessing the operation in the classroom at a later date. Doctors have found such 3-D color videotape presentations to be extremely helpful in the classroom. Many times, during the heat of an operation, a surgeon will make decisions about a choice of procedure and hours, days or weeks later may not be able to recall the precise circumstances that required that decision at that time. With the operation recorded in all the depth of 3-D color TV, the circumstances can be replayed for himself and the class. As a bonus, since the entire operation has been recorded on videotape, insurance companies may be more inclined to lower their malpractice premiums, since direct evidence is available to them should a case have to go to court.

Dr. Beale has performed numerous operations using the 3-D television image. The 3-D color image has given him the assurance and confidence to perform very delicate sewing, cutting and other procedures on the human eye in which depth perception is an absolute necessity. The inventor and patent holder, James Butterfield, reports that Dr. Beale has used the equipment to perform such procedures as the Strabismus (crossed eyes) operation, corneal transplants and cataract and cornea procedures. The high resolution image (1,023 scan lines as opposed to the 525

lines for home broadcast), the precision color control possible and the all-important stereo depth of the image have given Dr. Beale a unique and valuable tool.

Recently, Mr. Butterfield has been developing a Stereo Video Microscope for industrial applications. An obvious application is assembly line examination of micro-miniature integrated circuits which may have more than 30,000 elements on a chip only 1/4-inch square. In addition to seeing a high resolution 3-D color TV image magnified a thousand times, a flick of a switch enables the viewer to reverse the image from a positive to negative or to any number of "false-color" displays that often reveal details not normally visible. The 3-D TV camera can be made sensitive to infrared or ultraviolet light or even to X-rays, so that human eyes can see on the 3-D TV screen objects illuminated by "light" outside the range of human vision. Mr. Butterfield says that his Stereo Video Microscope "takes viewers on a voyage into micro-space in the same way that a spaceship might travel through outer space."

NASA has made use of Mr. Butterfield's 3-D TV to view 3-D pictures taken by Earth satellites. At the Goddard Space Flight Center in Greenbelt, Maryland you can look in 3-D down through the eye of a hurricane with stereo pictures taken by one of the weather satellites.

Back on Earth, Mr. Butterfield is building a 3-D TV system for Lawrence Livermore Laboratories. The 3-D TV cameras are the eyes of a WORM—a robot-like device that

can see in almost total darkness to explore areas of nuclear reactors too dangerous for human personnel. With the aid of the 3-D TV monitor "eyes," human controllers can check for radiation leaks and manipulate tools and equipment with the accuracy of full depth perception.

But what about 3-D TV at home? Well, there are quite a few systems being developed in the U.S. and abroad. In Australia the DOTS system attempts to make 3-D compatible with normal color broadcast: Viewers with special glasses will see a 3-D TV picture, but viewers without glasses will see a normal color image. The process has been criticized for the very low quality of the 3-D image created. In the United States there are both no-glasses and glasses-required systems. James Butterfield, again, has built a fully operational 3-D TV (the prototype is in black and white) that does not require the viewer to wear glasses of any kind. Russian technicians have been researching no-glasses 3-D since the early 1940s, but Dr. Victor Komar, one of the U.S.S.R.'s leaders in 3-D research and development, recently viewed a demonstration of Mr. Butterfield's 3-D TV without glasses and came away impressed.

This summer Mr. Butterfield will head up the U.S. delegation to a worldwide conference in Geneva, where one of the goals will be to establish broadcast standards for home reception of 3-D TV.

Because of the increasing activity in 3-D research many people have suggested that 3-D is finally "just around the corner." Cable-TV viewers may be the first to see test 3-D transmissions in this decade. The big stumbling block is the F.C.C.'s insistence on compatibility with current broadcast standards, but this summer the Geneva conference may sweep all that aside. But even within the F.C.C. there is no question in anyone's mind that the world will have 3-D and that, in the future, it will become just as standard as color TV is today.

If you think that your business or industry could profit by the application of 3-D technology, one or more of the following companies may be of interest to you:

3-D Television Systems, Inc.  
James F. Butterfield, Technical Director  
4382 Lankershim Blvd.  
N. Hollywood, CA 91602

StereoScope  
John Rupkalvis  
8208 40th Avenue North  
Minneapolis, MN 55427

Dimension-3  
Daniel L. Symmes  
256 South Robertson Blvd.  
Beverly Hills, CA 90211

Spacevision, Inc.  
EMI Films, Inc.  
9489 Dayton Way  
Beverly Hills, CA 90210



Above: Not a display dummy, this is a working 35mm stereo camera made from two standard Prakticas. It creates stereo pairs in the 24 X 36mm format and allows the photographer to see a true stereoscopic image through the twin viewfinders. It was created by John Rupkalvis, who also has a design for a 35mm stereo camera that permits a greater degree of stereo control than has previously been possible. Right: Spacevision's Trioptoscope lens developed by the late Robert Bernier. Spacevision uses a single camera; the prism lens "stacks" the left and right images one above the other in a standard 35mm frame.

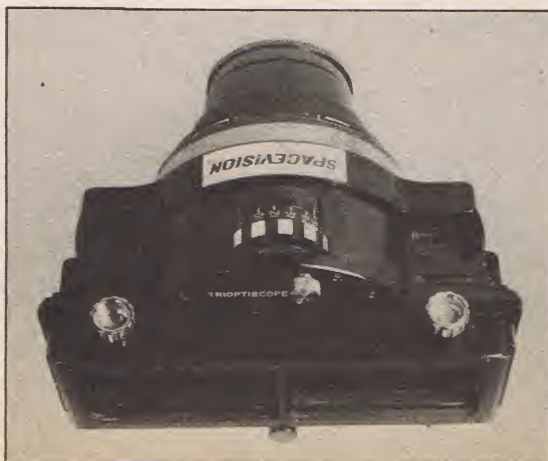
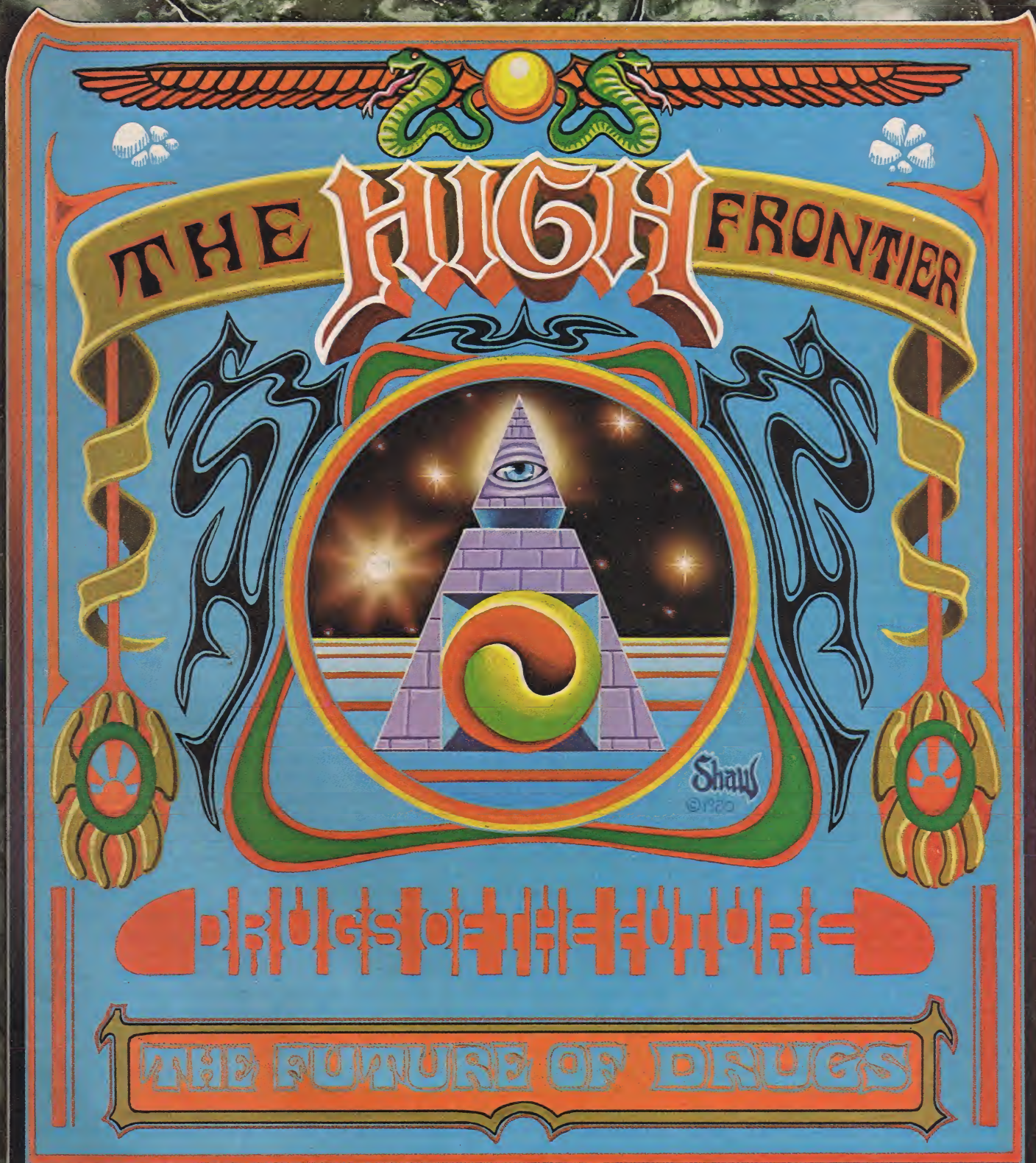


PHOTO: COURTESY JOHN RUPKALVIS/STEREOSCOPE

PHOTO: COURTESY SPACEVISION INC.



tomorrow



By NORMAN SPINRAD

Is it mere chance that the era of the science fiction boom, the opening of the human species' age of space, and the first era of widespread use of psychoactive drugs have so neatly corresponded? The birth of a counter-culture based on artificially altered states of consciousness, the entry of man into space,

and the movement of science fiction towards the center of popular culture have all been contained in a single decade—perfect synchronicity from any long-range galactic historical viewpoint. Pretty hard to put such a triple temporal congruency down to chance.

Many cross-connections can be made be-

tween these three existential cultural evolutions. *2001*, the movie that made the mass breakthrough for cinematic science fiction, owed much of its box office success to drugs. Dropping acid and tripping out on *2001*, not as a one-time experience, but as a kind of oft-repeated sacrament, was a mass phenomenon



that greatly inflated the box office figures. Intentionally or not, *2001* was a film designed to trip behind. And the trip was into space, the final frontier.

Real-life astronauts who experienced space in reality, even without artificially altered consciousness, came back changed men, as if they had had very heavy acid trips. And of course, Timothy Leary started as the Johnny Appleseed of LSD, and has ended up as a proponent of altered consciousness, space colonies, and artificially created immortality, which would seem to sum up some sort of connection between drugs, science fiction, and space.

Interesting too how people who are dubious about chemically altered consciousness usually cannot grasp the concept of humanity's galactic destiny, either as a program to finance, or as that weird science fiction stuff. And of course, most people who *do* use psychoactive substances usually have no trouble tripping behind science fictional realities.

We are poised on the brink of a new age and have been for some time by our current historical time-scale. We have taken the first step beyond the bounds of the ecosphere that gave us birth. From a long-term galactic viewpoint, this is surely the most significant step a species can take—out of planetary prehistory and into the infinite sea of the cosmic unknown. We have also succeeded in creating the means to abort our species maturity in the form of nuclear weapons capable at least theoretically of sterilizing our planet. We have gained control of our own reproductive process and freed our sexuality from biological determinism. We have in a sense transcended the process of biological evolution that created us for good or for ill. Future human evolution will be a scientific, not a biological process. Already, our consciousness is as much our own artform as our genetic heritage, and will become even more so in the future.

What do psychoactive drugs really do? To answer that, you must consider what the consciousness they alter *is* in the first place. We know that consciousness is a phenomenon that takes place in the human brain, as the result of complex and subtle chemical and/or electrical processes which we *don't* yet fully understand. The point is that consciousness, whatever it is, exists in a complexly synergetic bio-chemical and bio-electronic matrix, and that any alteration in the chemistry or the electronics alters consciousness itself, changes our perceptions, thoughts, and subjective realities.

Chemically and electrically speaking, even our evolved "natural" consciousness is being altered all the time—by events, by the environment, by the very food we eat. Fear pumps hormones into the system, and time tenses up into paranoid intensity. A good cup of coffee soothes frayed nerves, tobacco is associated with concentration by millions,



**N**orman Spinrad's outspoken and taboo-breaking writing has enlivened the literature of science fiction since he sold his first story to Astounding in 1963. As one of the leaders of SF's New Wave of the 1960s, Spinrad's fiction is more concerned with the terrain of inner space than outer space. His novels include *The Solarians*, *Agent of Chaos*, *The Men in the Jungle*, *Bug Jack Barron*, *The Iron Dream* and the recent *A World Between*. A new science fiction novel, *Songs From The Stars*, is due this summer in hardcover from Simon and Schuster, and a mainstream novel, *The Mind Game*, will follow soon after. His most recent short story collection is *The Star-Spangled Future*, a volume of vignettes about potential American tomorrows. He currently resides in New York City.

too much sugar affects students' performances.

So in a sense everything we eat or drink is a "psychoactive substance," since everything we eat or drink and a lot more affects our biochemistry to some degree, including, therefore, the biochemistry of the brain, the matrix of consciousness, and hence consciousness itself. We are what we eat, not only over time, but moment to moment.

When we "take drugs" we are choosing to ingest substances which have stronger and more consciously noticeable effects on the biochemical brew of consciousness than the usual background of our three meals a day. Usually, of course, we're trying to produce a particular alteration in our conscious state, something we can really notice. Or are we?

The Aztecs, for example, consumed vast quantities of cocoa, which was originally a fairly powerful alkaloid. Coca leaves have been chewed by Andean Indians since time immemorial throughout their workday. In other places, it is the betel nut. When coffee was first introduced into Europe, the powers-that-be fought it as a killer drug.

In other words, most human cultures have had one or more fairly significant psychoactive drugs incorporated in their lifestyle, even though they didn't often know that they were taking a drug because they were on it all the time. One culture's drug is another culture's glass of beer. In Islamic countries, they have traditionally used hashish, but righteously banned alcohol as an obvious mind-drug, and in Western culture vice versa.

But when masses of people started taking culturally new drugs in combinations, fixed consensus cultural realities started breaking down as the biochemistry of consciousness became an individual complex of choices, rather than a traditionally shared brain biochemistry. Still very much a trial and error personal experimentation with many mixed results.

Then chemists started creating psychoactive substances that never existed in the evolved environment, and psychochemistry created states of consciousness *that had never*

*existed before.* Currently, the first hesitant steps are being taken to a true science of psychopharmacology which will tailor molecules to create new states of consciousness to order.

In the future, and perhaps not so far away either, the biochemistry of consciousness will be much more fully understood, and long before the first spaceship or space colony leaves for the stars, human consciousness will be a totally human creation as we gain control of the fine chemistry and electronics of its material and energy matrix.

How far can this go? A consciousness not possessed of this power can only make what will inevitably be over-conservative guesses. Already we know how to create drugs that increase or decrease our psychic energy. We are on the brink of creating drugs that enhance memory and perhaps even increase intelligence. The brains of the great geniuses of the ages caused hypernormal consciousness to arise in them. If we learn how to create the biochemical and bioelectronic matrixes of genius, will we not be able to make the consciousness level of genius available to all on prescription?

There may be a genetic limit. The biochemistry of genius may turn out to be the optimum human brain chemistry, though this is by no means certain. But even if this is so, it won't be long before we're tinkering with our own genetic structure anyway, and scientifically improved brain biochemistry beyond the current maximum genius level from conception is at most a few generations away. Even if we do stick with our inherited genetic capabilities for old times sake, we will be interfacing with computers in ever-more-intimate ways, until finally these artificial augmenters of our intellectual powers will be as integrated into our consciousnesses as artificial senses like television and telephone are today.

Even beyond this, there is the matter of the "psychedelics," and the states of consciousness even the current ones create, about which our hard scientific knowledge is extremely limited. "Psychedelics" are fre-



quently called "hallucinogens," meaning that they cause people to see and hear things that "aren't real."

But what does that really mean? What one experiences under the influence of a psychedelic is the product of one brain biochemistry, and what one experiences without the drug is the product of another. There is no possibility of a neutral observer who can "objectively" decide which state of consciousness perceives what is "real" and which is "hallucinating."

Of course there are ways of making an educated guess as to which perception is "realer" than the other. If you see a doorway where someone else sees a brick wall, the question is whether or not you can walk through it.

Still, there are plenty of people who in effect believe they *have* walked through brick walls on psychedelics. People whose lives have been drastically changed by "hallucinations." People who have experienced ecstasies beyond any dream of heaven, and people who have experienced bummers deeper than the pits of hell. People who will swear they've had telepathic experiences and people who can sometimes demonstrate some hint of these powers. People whose perceptions of reality and relation to it have been drastically altered in a few hours, permanently.

Like many of the NASA astronauts who have experienced the altered reality of space. One of whom, Edgar Mitchell, altered his career to pursue the illusive sciences and pseudo-sciences of human consciousness.

We know that our natural evolved senses have certain parameters and limits. We perceive only that small portion of the electromagnetic spectrum, for instance, between red and violet, which we are pleased to call "visible light." We also know that other terrestrial organisms perceive things that we can't perceive without artificial aids. Dogs live in a vivid universe of smell utterly beyond our poor noses, dolphins have "x-ray vision" via biological sonar, insects see compounded images of the total environmental surround, and some organisms seem to be sensitive to lines of geomagnetic force.

Have some of our early psychedelics altered brain biochemistry and opened up wider ranges of sensual perception, or at least different spectra from what we ordinarily experience? A question still very much in doubt today, but there is little reason not to expect that the tailored and designed drugs of the future will be able to greatly widen our areas of sensory sensitivity, especially if you include tailoring our genes in the scientific repertoire.

Why has the capability to utterly transform our own consciousness by deliberate act of will and along many different vectors emerged just as we're dipping our feet in the ocean of space? Is this really a coincidence?

Space flight implies a certain level of science and engineering, which in turn implies a certain general level of scientific sophistica-

tion, which in turn implies a certain level of psychochemical knowledge.

Space flight is a declaration of freedom from the physical ecosphere in which we evolved, and psycho-chemicals are a declaration of independence from the minds we were born with.

"Inner space" and "outer space," the biochemical microcosm and the universal macrocosm; once you set out to play around with one, you're already playing around with the other.

After all, one of the main features of a space environment is altered gravitational states. On Earth, on the planet we evolved on, gravity is a constant and predictable unidirectional field of force that has pervaded every earthly organism since life began. In space, gravity is a human choice. With a little maneuvering and tinkering, you can have as much or as little of it as you want, or eliminate it entirely.

This is bound to do things to something as complex and delicate as the biochemical and bioelectronic matrix of human consciousness, just as it appears to have other effects on less finely tuned human biological systems.

So in an absolute biochemical and bioelectronic sense, space travel itself is a whole spectrum of psychedelics as far as the end results on the brain and consciousness are concerned. So too, if in extremely subtle ways, will be the human-created ecospheres of space colonies. Beyond the solar system, if we get there, there will no doubt be many planets where the atmosphere will support our form of life. So we'll go around breathing these alien atmospheres. But though they'll support our basic metabolism, they won't be the brew we evolved in, and their total realities might be far stranger to us than mere exotic backdrops and alien cities. We could breathe an atmosphere with nitrous oxide in it indefinitely, for example, but we'd sure know we weren't in Kansas.

Evolutionarily speaking, we're going to have to cope with a lot deeper things than propulsion systems and life support systems and mining the asteroids if we are going to successfully make the transformation to a long-lived, space-going sane-enough-to-survive species. What we will be attempting is no small thing—to step beyond the deterministic bounds of the ecosystem that evolved us and become our own creations, masters of matter and energy, able to travel and live wherever we choose, creators of our own universe. There will be those who will point out that Faust was dragged down into the pit for just such arrogance, that therein lies madness.

Inner space and outer space, the universal macrocosm and the internal subjective microcosm, once you play around with one, you're playing around with the other.

So before you do, you'd better know what you're doing.

Which is why drugs and science fiction are

synchronous with the evolution of space-going capabilities, like traits carried by a single historical gene.

In this early stage of evolution, we think of drugs as stuff that people take to get "stoned" on. Recreation. Depravity. A vacation from reality. Even those who are into drug experiences on a mystical level like the peyote shamans of Mexico or the adherents of Leary's acid religion are still letting the drug take them on its trip.

But as psychochemistry becomes a real science, as it emerges from its primitive roots as molecular biochemistry eventually arose out of herbalism, we will be choosing drugs to take us on *our* trip, as surely and precisely as a well-run spaceliner schedule.


We are going to need the ability to be self-conscious masters of our mental processes as we peck free of our terrestrial eggshell and fly off into the unknown. Because we will no longer be able to count on our "naturally evolved" brain biochemistry as a benchmark of sanity. We will have left that behind on the Earth. In time, there may not be a single living human being who isn't tripping all the time by the standards of the terrestrial biosphere.

Science fiction is the best we can do to imagine some of these future interactions of altered macrocosm and altered microcosm, of mutating environment generating mutating consciousness in a dynamic feedback loop. Personal experimentation with altered states of consciousness is a kind of cookbook attempt to prepare the species for a higher order of trans-terrestrial consciousness. A consciousness able to navigate the stormy quicksilver seas of a constantly altered brain biochemistry and constantly changing subjective reality.

Now of course a lot of science fiction does not achieve its higher goals, and a lot of people have bad bummers on the current spectrum of psychoactive drugs.

But nobody ever promised us that there were no dragons in space, inner and outer. As we peck our way out of the eggshell, the only thing we can know until we get outside is that the big world out there is going to be a lot more complex than we can conceive of now.

But if we emerge into trans-terrestrial history as the scientific and creative masters of our own physical matrix of consciousness, if we've explored a goodly portion of the terra-incognita within, mapped it out, and established outposts, then we'll be ready for the continuously altering realities of the greater galactic macrocosm. Or at least we'll have a sporting chance.

Today, science fiction fulfills this function as best it can with our naturally evolved creative powers, and people leap into the unknown with a primitive spectrum of unreliable drugs. But by the time the first baby is born in any space colony, the art of imagination will have a reliable technology of consciousness at its disposal. We can't leave the nest until our eyes have opened. 



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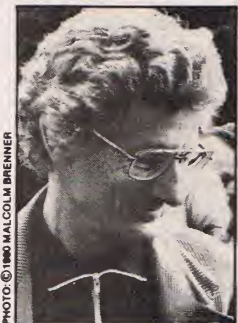
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# next issue

## THE EMPIRE STRIKES BACK

The second act of *Star Wars* is now zooming toward nationwide theatrical release and FUTURE LIFE #20 will feature a comprehensive story on the two-year process of making the second film in George Lucas' "first *Star Wars* trilogy." Executive producer Gary Kurtz provides insight into the *Star Wars* philosophy of successful fantasy-making, while other key contributors shed light on the screenplay, the special effects and the imaginative otherworldly designs to be seen in the film. Don't miss *Star Wars*: Chapter Two.



## WHAT'S KEEPING THE SPACE SHUTTLE?

Some of us are beginning to wonder if NASA's revolutionary spaceplane is ever going to make it off-planet, and if you're wondering the same thing you'll be interested to know just what's keeping the space shuttle on the ground. Now scheduled to make orbital test flights at the end of 1980 or the beginning of 1981, the shuttle has had to surmount an endless list of technical hurdles. FUTURE LIFE explains what's taking the shuttle so long, plus dozens of exciting projects that can be done in space as soon as the shuttle is operational.

## LASER INVASION

Heat rays and laser beams have been staples of science fictional warfare ever since the Martians attacked a helpless Earth in H.G. Wells' *War of the Worlds*. Now lasers have entered the real-life arsenals of Earth armies. But happily lasers have been put to a wide variety of other uses. FUTURE LIFE takes a look at the many applications of lasers in today's world—entertainment, medicine, communications, industry—and future uses that even the prophetic Mr. Wells could not have imagined.

## INTERVIEW: JOHN C. LILLY

One of the most controversial scientists of our time talks about his pioneering experiments in sensory tank isolation, his insatiable curiosity about the dimensions of the mind and his fascinating research in the area of communication between humans and dolphins. His current focus, Project Janus, is the most sophisticated attempt to date to talk with dolphins, utilizing a computer and sound synthesizers to forge a method of two-way, interspecies communication.

## PLUS

New poetry from Ray Bradbury... How the United States Congress looks into the future... Ambitious plans for a 24-hour TV news program soon to be coming your way via satellite from Ted Turner's cable Super Station... Android music from Britain's science fictional melody-maker, Gary Numan... A portfolio of unearthly art from Galactic Geographer Karl Kofoed... The return of Earth Control... and much, much more!

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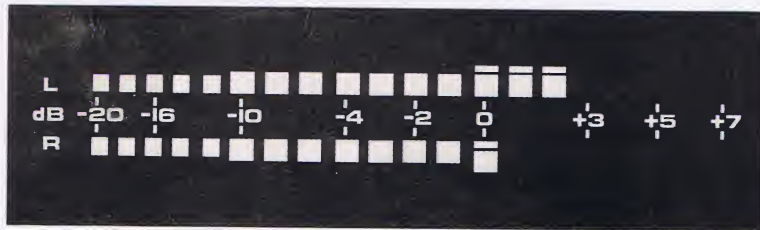
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